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Archives of PHYSICAL MEDICINE and REHABILITATION

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ARTHUR L. WATKINS, M.D.
Boston

3rd International Congress of Physical Medicine
and
88th Annual Session • American Congress of Physical Medicine and Rehabilitation
Mayflower Hotel, Washington, D. C. • August 21-26, 1960

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3. The essay must not have been published previously.

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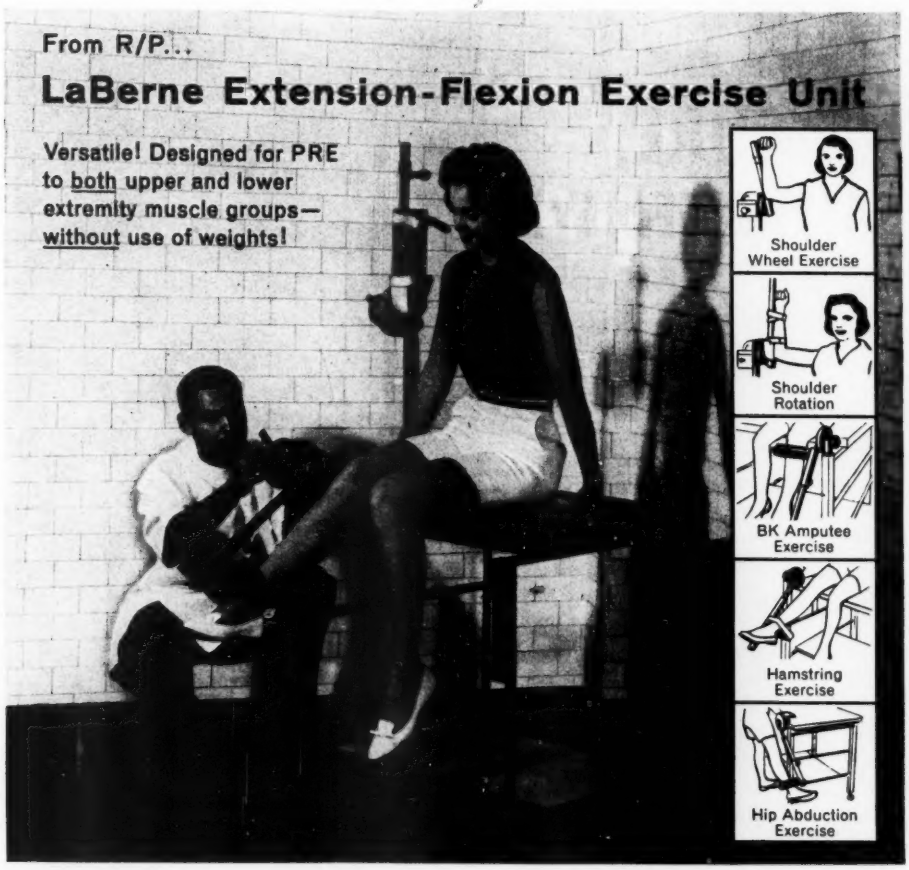

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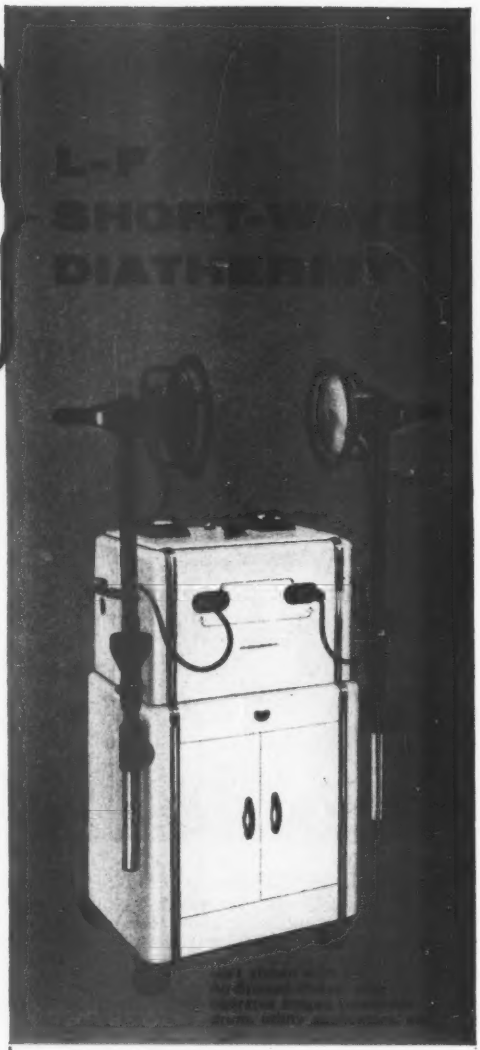

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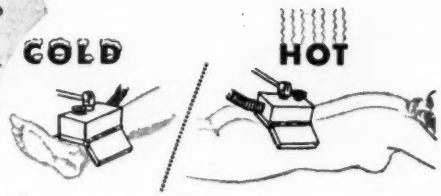

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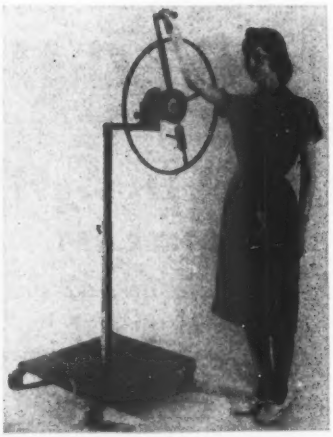

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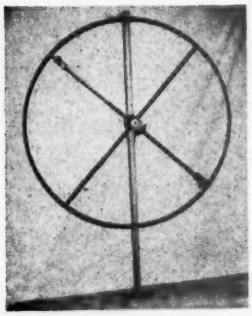

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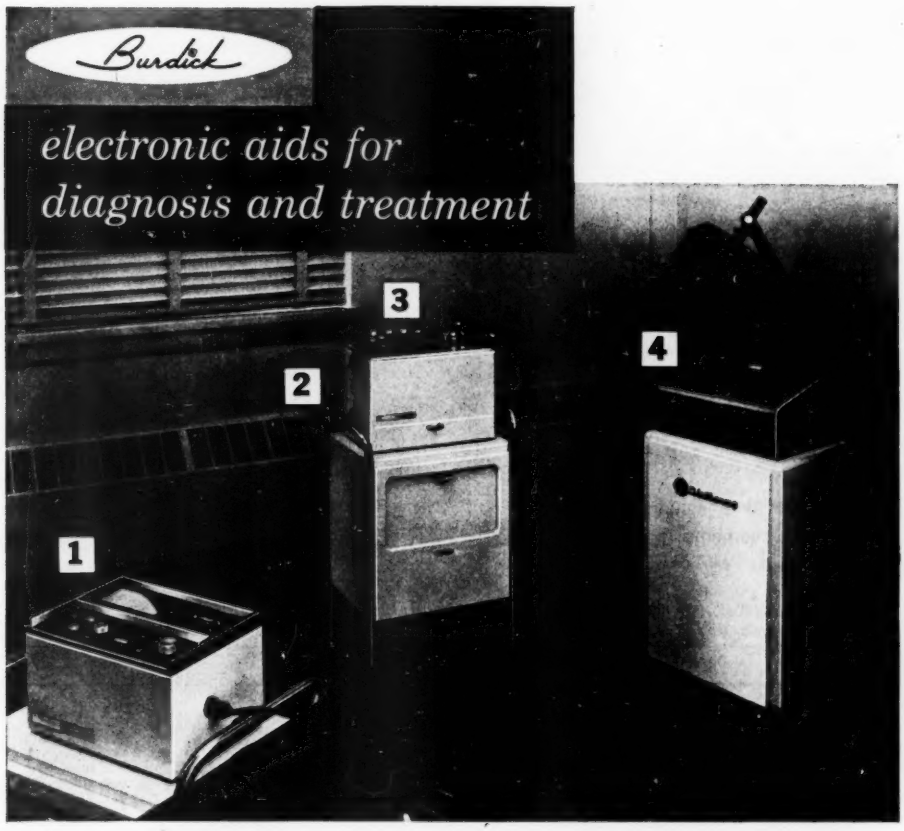

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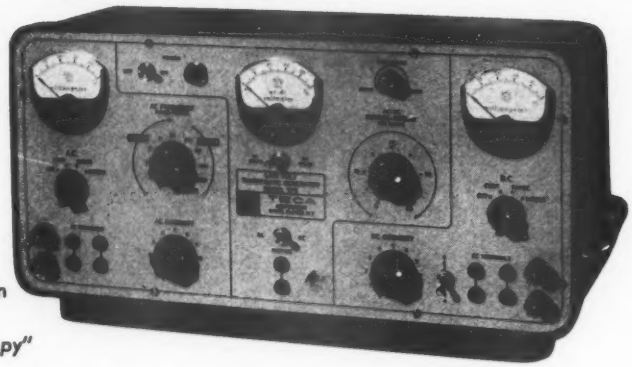

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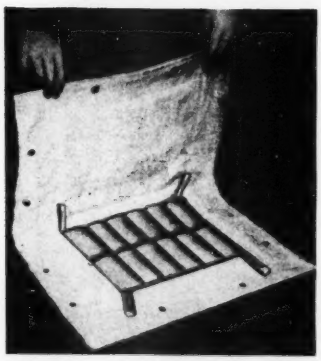

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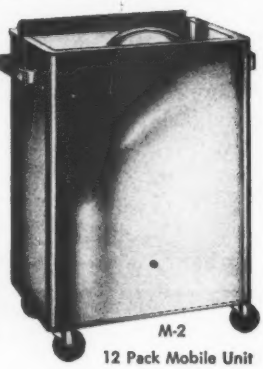
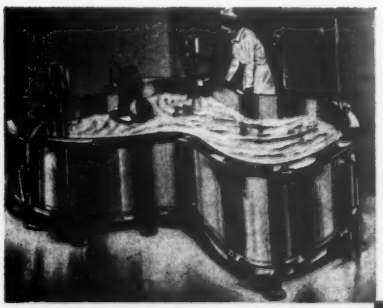


M-2
12 Pack Mobile Unit



HM-801
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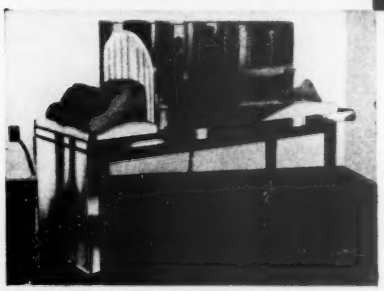

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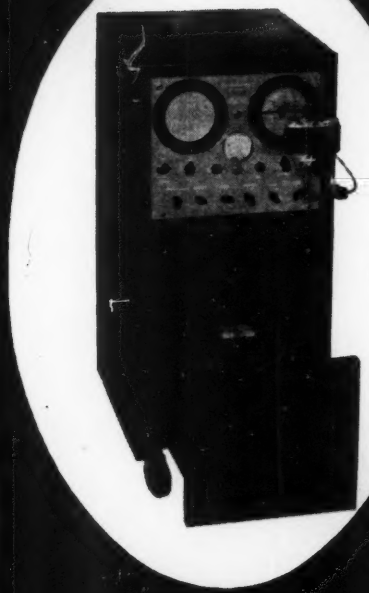

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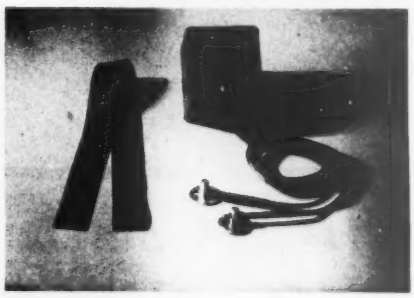

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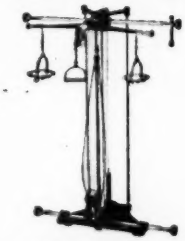

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Physical Medicine and Rehabilitation — A Phase of Human Ecology

Arthur C. Jones, M.D.
Portland, Ore.

● The thought that physical medicine is ancillary, adjunctive or dispensable must be replaced by the conviction that physical procedures are essential elements in any plan for treatment of a patient, omission of which may amount to neglect. Physical medicine and rehabilitation should be a constant consideration of every general practitioner and specialist. This will result in better care for patients everywhere. Everyone who is identified with the specialty bears a great responsibility.

Specialties in medicine develop in response to special human needs. The growth of knowledge about certain systems, parts or aspects of mankind has led to the development of special skills, instruments and disciplines. This has placed emphasis on disease entities, systems, or organs, and has resulted in much necessary analysis of body and mind, and to the discovery of bacteria, viruses, and metabolic faults. The remarkable strides made by medicine within the past three decades are almost unbelievable, even to those who have shared in them. In this spate of discovery and exploitation of scientific facts in medicine, physician and medical educator alike have tended to lose sight of the patient as an individual in his environment. With this tendency to think of patients as cases, the physician-patient relationship has become attenuated. This is an unfortunate development which the doctor and patient may well decry.

A reversal of medical emphasis from fact-splitting analysis of the disease entity, as Bloom[1] calls it, toward a synthesis of data in behalf of the whole patient is a healthful trend. Doctor Steiger[2,3] has established the first principle to govern the Comprehensive Clinic at Temple University Medical Center: "that physicians should have PEOPLE as their primary interest." Among those physicians who have shared in the development of this concept of total care for the individual, the specialists in physical medicine and rehabilitation have had a leading part. Here is a specialty which is concerned with the whole person. The dynamics of movement and of motive necessitate a study of the entire man, his drives and his responses to his environment. Rehabilitation has the task of bridging the gap between the hospital and the kitchen, between the sickbed and employment. The very process is a medicosocial one, a teamwork which starts with medical diagnosis and ends only when the person who is the object of this effort is established in an optimal social and economic situation.

A glance backward is always in order at an annual meeting of our group. A varied group of individuals originally formed this congress. Some of these men were concerned chiefly with electrotherapy; others with hydrotherapy, with medical gymnastics, or the use of heat and light in medicine. There was much emphasis on technics. Equipment was subject to much debate.

Gradually, special physiological responses to physical energies and methods began to receive more deserved emphasis. More controlled experimentation was done, measurements of all sorts were taken. Impetus was given in this by the development of fever therapy in the 1930's and by the expansion of biophysics. These developments lent weight to the words of physicians who ventured to teach physical medicine, and instrumentation became much more scientific. Evaluative methods, such as muscle testing, work-load studies and then electromyography, have added still more weight to the opinions of the specialist in physical medicine as a diagnostician. He has become a source of dependable knowledge to his confreres as to how extensive a patient's involvement may be, and how much function might remain; he has much to say about prognosis, through good, firm measurements based on physics and anatomy.

Presidential Address, read at the Thirty-seventh Annual Session of the American Congress of Physical Medicine and Rehabilitation, Minneapolis, September 2, 1959.

Professor of Physical Medicine, University of Oregon Medical School; Medical Director, Rehabilitation Institute of Oregon.

Physicians have always been aware of the values of mobilization and exercise as therapy, but medical gymnastics somehow fell into disrepute during the first half of the twentieth century. Specialists in physical medicine and rehabilitation have done much to refocus attention on these measures as both preventive and curative. Movement has been shown to be one of the most specific means of giving pain relief and rapid return of function. Doctors tend to take movement for granted and to disregard exercise as part of the prescribed regimen for patients.

Reconditioning during World War II demonstrated fully the preventive and curative values of prescribed movement. Just as convalescent soldiers were returned to duty earlier, so have civilians been returned to useful, gainful lives in society through reconditioning, now developed into rehabilitation. There is so much to be done in this area, and so much to be taught to medical students, that we have hardly made more than a beginning in just this one basic phase of physical medicine and rehabilitation. The surgeon and the physiatrist are natural allies in this matter of exercise, since early ambulation has proved to be a boon to patient and surgeon alike in reducing postoperative complications and cutting down on hospital days and job-time losses. It is imperative that responsible medical educators recognize the importance of teaching the preventive, conserving and curative values of prescribed movement.

Today the physiatrist is the chief exponent of the balanced prescription for physical measures of treatment. This balanced prescription is based on a truly searching study of the patient as a person. Diagnosis is backed by much evaluation as to the degree of involvement, weakness, or incoordination. Then follows the outline for physical energies and procedures, generally in about the following order:

Rx — 1. Heat — in an appropriate form, or cold, when and as indicated.
2. Passive mechanical measures, such as massage, traction, mobilization.
3. Exercise — either assistive, active or resistive, designated in terms of specific dosage.
4. Specification of coordinated movements and action patterns to be taught by the therapist, ranging from simple gymnastics or self-administered traction, to complicated tasks.

Dosage is defined in terms of pounds to be lifted, repetitions, in milliamperes of current, watts per square centimeter per unit of time, or other specific directions which are fully understandable to the therapist. Exactitude of technics is nowhere more important to good results than in physical medicine. Objective tissue changes take place when physical therapy is properly applied, often the *most specific* method of treatment at our command, as shown by gross and microscopic alterations in muscle, fascia, and bone.

Building a complete program of rehabilitation includes the prescription for physical measures as outlined, and involves much more besides. This is an art which takes into account medical, emotional, social, and vocational factors, extended through a time period, with provision for appropriate changes as they may become necessary. Diagnosis, evaluation, measurements, tests and personality studies must precede the planning of the rehabilitation program. Social realities must be known. Job background, education, aptitudes and attitudes of the patient are factors which must be weighed in the plan. After these assessments have been made, the actual program must be outlined. It may include measures necessary to relieve pain, to mobilize one or many parts, to strengthen muscles, and to coordinate movements. It often must indicate means of ambulation, including bracing to enhance movement, a prosthetic limb, and a sequence of specific exercises and gait training. Motivation goes along through any plan for rehabilitation, like the warp through which the weft is woven. Motives can be educated[4,5] and motives lead to significant action.

Tuttle states that the creation of motives is produced solely by the association of satisfaction with behavior patterns. Our experience in rehabilitation gives strong support to this concept. It is basic to successful rehabilitation.

Evaluation must be done again and again during the rehabilitation process, as part of the training for final adjustment to living and work. Various members of the rehabilitation team share in the process in varying degree and over various portions of the time involved. Social and vocational factors should gradually come to have lesser importance, though they never can be fully submerged. The patient and his family must always be kept in the center of the plan throughout the rehabilitation process. Rehabilitation is not divisible into various phases, such as "medical," "social," "vocational," but is a continual, varying process — a *continuum*.

Those who are familiar with the ecological approach to the life sciences may see easily the similarities between rehabilitation and the interplay between various living organisms and forces in an ecological life zone or community. Just as a fish in a pond survives and grows in relation to the available oxygen, the food, and the activities of every other member of the living community in that pond, so the patient improves and adjusts to the realities of his environment during and after his rehabilitation. Rehabilitation is an expression of human ecology for each patient and all who share in it with him. The dynamics of this interplay of life forces are difficult to define. The implications of this concept of life in its total environment are challenging alike to physician, sociologist, and philosopher.

The ecologist asks that unquestioned beliefs should be questioned. F. Fraser Darling, a British ecologist, defines human ecology[6] as that study which deals with the structure of animal communities which man dominates, and their development through principles of succession. Such a study of human problems requires a fresh spirit of inquiry. In the same spirit, physical medicine and rehabilitation require that some fixed beliefs in medicine be questioned. This leads to disturbances of some established concepts and practices of the medical community. Such disturbances elicit reactions which are quite natural. The normal counterforce needed to quiet such negative responses on the part of doctors in any community is the demonstration by all who have any part in the new specialty that we have only the desire to help improve medical care, and that we are both ready and competent to help. Physiatrists and all their co-professional workers have the responsibility of developing and maintaining the very highest standards of education and performance in the specialty. One does not demand respect; he can only earn it.

The physiatrist, like the ecologist, has not yet been classified and placed in a niche in the scientific and medical scheme of things. This inhibits more rapid and positive acceptance of physical medicine and rehabilitation. Perhaps a stereotype lingers in the minds of doctors and deans, of a rather peculiar character in a basement department, cluttered with electrical apparatus and lamps, advocating empirical treatments in a pseudoscientific jargon of his own. The modern, board-certified specialist in our field, with his team of highly trained therapists, could hardly present a greater contrast to such a stereotyped picture.

An inquiry into what kind of person the specialist in physical medicine and rehabilitation is, or should be, is certainly germane to this subject. First of all, he must be a thorough-going clinician. He must have a most unusual breadth of scientific interest and medical knowledge, which should be matched by an equal breadth of understanding of human needs. Such social consciousness is not only desirable, but necessary to one who is to supervise the return of a disabled person to his maximum function in his optimal social environment.

The physiatrist is specially schooled in physics and physiology. To him, anatomy is a living, daily discipline to which he constantly returns. He must have a special knowledge of neurology, rheumatology, and diseases of muscles and connective tissue. He deals daily with disorders of the vascular system and with autonomic disorders. He has at his hand some of the most potent forces we know in the relief of pain. He must know pain phenomena well. And always quantitation, evaluation, and testing must continue in his everyday work if the physiatrist is to further the purpose of all medi-

cine in helping people toward a goal of medicosocial homeostasis.

The realities of many institutions in which specialists of this field must function seem to require all the above-cited knowledge and interests, but also the skills and diplomacy of a medical administrator, a conference leader, a director of research, and a medical journalist. Such functions can not be carried out from a swivel chair behind a desk, nor by checks and initials on reports compiled by technical personnel. The physiatrist needs to be out on the wards, making rounds with other specialists, serving as a consultant in a wide variety of cases, and directing and supervising personally all paramedical personnel of the rehabilitation team. He must see and validate requests for therapy or testing, then compile results of tests and treatments for the benefit of patients and fellow physicians. Both ethics and the law require that the specialist function as a responsible consultant. He is, therefore, answerable for all professional activities of each and every therapist within his jurisdiction.

Because physical medicine and rehabilitation is a specialty of an ecological quality, it shares with ecology the advantages of diversity of approach and of the synthesis of facts and forces which are bringing medicine around the cycle from the piecemeal trends of specialism back to the whole-person approach of the general practitioner. Just as the generalist must have a wide variety of instruments and resources, so must the physiatrist also. Because movement is a universal common denominator of life and health, the means of securing movement are most varied. For this reason, the physiatrist works with practically every other specialist, as a collaborator who is equipped to further the efforts of his fellows toward restoration of significant movement to the patient.

The principle of "significant movement" does not minimize the principle of rest in medicine, but points up the fact that both are essential to good medical care. The decision for the doctor is concerned with the *amount* of rest or fixation, and the *amount* of exercise the patient should have at any one point in his management. Medicine has long tended to overemphasize rest and minimize or neglect movement. Movement is now coming back into the attention of our profession as one of the most important elements in pain relief, increase of metabolism, activation of motives, and normalizing of emotions. We are coming to realize that movement must not and cannot longer be neglected nor taken for granted. Life has been defined as "a continuous interchange of energy within the protoplasmic substrate." Life without movement becomes to the human being a state of vegetation, a mere existence. Medically speaking, inaction is dangerous. The physician must be at some effort to guard against those dangers of quietude. Physical medicine offers to the entire medical profession the healing powers of the entire energy spectrum, and above all, movement. In the last analysis, *significant movement is the major objective of the entire healing art.*

To be significant, movement must be meaningful to the patient himself, then to his family, his neighbors, and finally his community. "Significant movement" implies motives which prompt movement, hence a set of values. The concept includes something of the character, the moral nature or ethos of the patient and of the society of which he is a part. Darling[6] states that this moral nature, or "ethos," is still the biggest ecological factor of all in the life of the individual.

In order to make physical medicine and rehabilitation a more completely integrated part of the healing art, every person identified with the specialty must strive to dignify it by doing the finest clinical work in every setting where the discipline applies. We must impress doctors and medical educators with the fact that physical methods of diagnosis, evaluation, and treatment are often the most objective methods available, and more specific than any other in many clinical conditions. The thought that physical medicine is ancillary, adjunctive or dispensable must be replaced by the conviction that physical procedures are essential elements in any plan for treatment of a patient, *omission of which may amount to neglect.* We must teach with

such force, with such valid fact and demonstration, that physical medicine and rehabilitation will come to be a constant consideration to every general practitioner and specialist. We can be certain that this will result in better care for patients everywhere. Everyone who is identified with physical medicine and rehabilitation bears a great responsibility and shares a great privilege as an exponent of the restoration of significant movement. With this ideal in view at all times, may the American Congress of Physical Medicine and Rehabilitation continue to grow in quality and usefulness to every citizen through the years that lie ahead.

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Preliminary prospectus of the 3rd International Congress of Physical Medicine scheduled for Washington, D. C., August 21-26, 1960.

A copy of the prospectus may be had on request by writing to Walter J. Zeiter, M.D., Secretary General, or Dorothea C. Augustin, Executive Secretary, 3rd International Congress of Physical Medicine, 30 N. Michigan Ave., Chicago 2, Illinois.

Comparative Study of the Efficiency of Short-Wave, Microwave and Ultrasonic Diathermy in Heating the Hip Joint

Justus F. Lehmann, M.D.
Jo Ann McMillan, B.S.
George D. Brunner, B.S.
and
Jack B. Blumberg, M.D.
Seattle

● It is demonstrated in this study that the temperature of the hip joint could be raised to any desired level by application of ultrasound. Since the rise of temperature measured in that part of the joint directly exposed to ultrasound was much greater than that recorded where the ultrasonic beam had first traversed the bone, it seems advisable to treat the joint from all aspects. Readily accessible for treatment in the human are the anterior, superior, and posterior aspects of the hip. Microwave and short-wave diathermy did not produce a temperature within the therapeutic range in the hip joint. It is assumed that the experimental findings obtained with these forms of energy can be explained by the differences in the depth of penetration, the most important determinant being the thickness of the subcutaneous fat and musculature covering the area being treated.

The application of heat is generally considered to be an essential part of the management of many forms of hip joint disease. The patterns of heat distribution produced by therapeutic heating devices may vary considerably, depending on many factors. The conversion of electric currents, of electromagnetic radiations, and of accoustic radiations result in higher temperatures in deeper layers of the tissues, while conductive devices heat the more superficial layers. It follows that the therapeutic effects derived from a modality will be dependent upon the pattern of heating and depth of penetration achieved. In the heating of superficial tissues, only a few mild physiologic and therapeutic reactions of a reflex nature may be expected in the deep structures, such as the hip joint. However, all desired effects, including the increase in stretchability of fibrous tissues described by Gersten,[1] can be obtained readily by heating these areas directly. The practical complication to avoid is that of burning the intervening tissues while raising the temperature in the deep structures to a therapeutic range. This would indicate the need for the highest temperature produced throughout the tissues to occur at the area being treated. Then, by varying the dosage, the temperature developed could be varied within the therapeutic range.

These considerations suggest that it is essential to know which of the available diathermy modalities is most efficient in elevating the temperature of deep structures, such as the hip joint, to therapeutically useful levels.

Methods

The adult pig was the animal of choice for these experiments due to its similarity in size to humans. The ratio of skin, fat, muscle, and bone is also comparable. The weight of the pigs varied from 100 to 180 lb.

Using aseptic surgical technic, the operative site was shaved and draped, and a longitudinal incision was made over the hip joint, continuing down to the greater trochanter. The fibers of the gluteal and lateral thigh musculature were divided, and a portion of the greater trochanter was transected exposing the cancellous bone at the base of the femoral neck. A pilot hole was drilled through the cancellous bone. A 20-gage hypodermic needle, containing a thermistor bead in its tip, was inserted through the hole with the tip protruding into the fibrous capsule over the anterior aspect of the hip joint. In each case, the location of the thermistor was checked again by autopsy at the end of the experiment. The shielded wires leading from the thermistor needle were diverted through separate stab incisions in the muscle and skin. The ends of the wires were buried in the subcutaneous tissue

Department of Physical Medicine and Rehabilitation, School of Medicine, University of Washington.
Department of Surgery, School of Medicine, University of Washington (Dr. Blumberg).
This work was supported by a grant from the National Institutes of Health, Bethesda, Md.

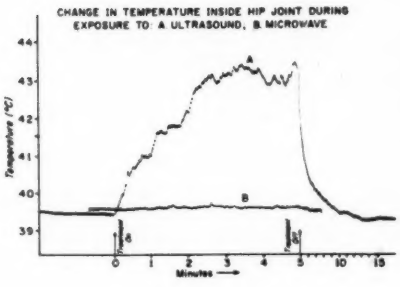

Fig. 1

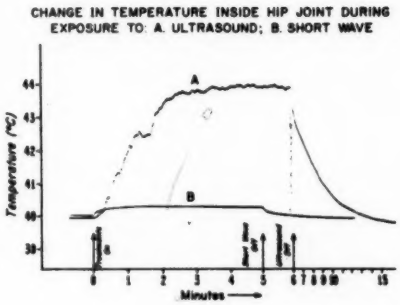

Fig. 2

under the stab wound. The reflected part of the greater trochanter and its associated musculature were sutured into position. The incision was closed in the usual manner.

After a postoperative recovery period of 10 days, the unanesthetized pig was immobilized in a box designed to maintain his correct position for treatment. The wires leading to the thermistor were recovered by grasping them with a thumb forceps. Separate treatments with ultrasound, microwaves, and shortwaves were administered in standard therapeutic dosages. With ultrasound, the applicator used had a radiating surface of 12.5 cm. and a frequency of 1 megacycle. The standard stroking technic was used. The pig exhibited no signs of discomfort during the treatment. The microwave diathermy was applied with a "C" director, which was positioned to maintain the proper distance between applicator and skin. By alignment of the thermistor needle and wires parallel to the magnetic field vector, any possible induction of high-frequency currents was minimized. Treatment with short-wave diathermy was applied to the hip with a drum applicator. The drum was aligned to minimize the induction of a current in the thermistor needle, as was done in the microwave application. The maximally tolerated dosage was applied with microwave and short-wave diathermy. Pain and marked hyperthermia in skin and subcutaneous tissues (first-degree burn) occurred in each case. All three modalities were used in treating the same pig on consecutive days.

Experimental Results

Typical temperature curves obtained in the hip joint during exposure to ultrasound, microwave, and shortwave diathermy are shown in figures 1 and 2. It was found that short-wave and microwave diathermy did not result in a therapeutic rise in temperature in the hip joint. However, it was possible to raise the temperature to any desired level by application of ultrasound, depending upon the intensity utilized.

In one pig, the thermistor needle was positioned in the posteromedial aspects of the hip joint. Temperatures recorded there were produced by ultrasound which had first traversed the femoral neck, and they were considerably less than those resulting from direct exposure.

The results of the experimentation are summarized in the table. Temperature increments were evaluated by t test, using the matched pairs method. Comparisons were made of increments of different modalities, using the independent samples method.

All changes in temperature produced with ultrasound, microwave and shortwave were significant at the 1% level of confidence. All results obtained with ultrasound were significantly greater at the 1% level than those achieved using microwave or shortwave, except in the case where ultrasound first traversed the bone before reaching the area of the thermistor. Under these conditions, the ultrasound increment was significantly greater at the 5% level. Ultrasound applied with an intensity of 2.5 w/cm^2 resulted in temperature changes signifi-

Rise of Temperature (°C) in Hip Joint During Application of Diathermy

Modality	Output	Duration of Treatment (Min.)	Number of Exposures	Pre-Treatment Temperature (Mean)	Change in Temperature Inside Hip Joint	
					Mean	Standard Deviation
Ultrasound*	1.5-2.0 w/cm²	5	6	39.79	1.43	.479
	2.5 w/cm²	5	12	39.62	4.01	.660
	3.0 w/cm²	10	7	39.34	.48	.060
Microwave	50-80% with C-director at 1-2 inch spacing	20	17	39.58	.10	.088
Short wave	90-110 ma. with drum applicator at 1-2 inch spacing	20	11	40.05	.30	.136

*Radiating surface of applicator: 12.5 cm²
†Thermistor located inside hip joint capsule on the opposite side from area treated.

cantly greater at the 1% level than those produced at an intensity of 1.5 to 2.0 w/cm². Only ultrasound produced temperature changes which fell within a therapeutic range of 41-44° C. It is possible that the consistent increments produced by microwave and shortwave could be attributed to a minimal induction of electrical current in the thermistor needle.

These experimental results are consistent with those of previous investigations using short-wave and microwave diathermy.[3-5] It has been shown that these modalities may effectively heat joints covered by relatively small amounts of soft tissues. On the other hand, neither method was found to be useful in heating organs buried deep in the tissues, the only exception being pelvic diathermy in which internal electrodes are used.[6-8]

Summary

It was demonstrated that the temperature of the hip joint could be raised to any desired level by application of ultrasound. Since the rise of temperature measured in that part of the joint directly exposed to ultrasound was much greater than that recorded where the ultrasonic beam had first traversed the bone, it seems advisable to treat the joint from all aspects. Readily accessible for treatment in the human are the anterior, superior, and posterior aspects of the hip.

Microwave and short-wave diathermy did not produce a temperature within the therapeutic range in the hip joint. It is assumed that the experimental findings obtained with these forms of energy can be explained by the differences in the depth of penetration, the most important determinant being the thickness of the subcutaneous fat and musculature covering the area being treated.

The preceding study does not take into consideration the possible contributions of nonthermal effects to the therapeutic results.

Acknowledgment: The authors are grateful to Mr. Vilas C. Johnston for his technical assistance; and are also indebted to the Burdick Corporation and the Dallons Laboratories, Inc. for providing the equipment for this study.

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Report of Development of the RIC Plastic Tenodysis Splint

Clark Sabine, O.T.R.
Fred Sammons, O.T.R.
and
Bernard J. Michela, M.D.
Chicago

● In attempts to meet the three basic criteria for an ideal tenodysis splint, use of polyester resin has been explored. It is felt the RIC splint meets the basic criteria more than does a metal splint. While clinical application to date has been limited, results have been sufficiently gratifying to merit more widespread consideration in hand disability problems.

The problem of fabricating a splint which utilizes wrist extension to obtain a pincer grasp of the fingers has been explored in the past. This device was generally fabricated from metal and used a solid rod from the wrist piece to the finger piece.[1] Ideally, the tenodysis splint should impart function without significant loss of power by friction or mechanical parts, thus utilizing all available muscle power to increase strength of grasp. In addition, the patient should be able to put on and remove his own orthesis, and it should be cosmetically acceptable to him. In order to provide a maximum amount of area for more dependable gripping, material should be eliminated from the web space and finger pads insofar as possible. The use of plastic resins, such as the material used in constructing artificial arms, seemed to offer possibilities not present in a splint fabricated from metal. This report deals with such an experimental splint developed at the Rehabilitation Institute of Chicago.

Prescription

While this splint would be theoretically of value in any patient who has lost the ability to flex and extend his fingers, but has retained the ability to extend his wrist, our experience has been limited to only two diagnostic areas to date, including five quadriplegics and one post-poliomyelitis patient. Table 1 indicates the level of lesion and muscle strength of the patients being reported. Studies are now being made to determine the minimum strength of the wrist extensors required to operate the device.

Principle of Operation

The splint is composed of three parts — a wrist cuff proximal to the ulnar styloid, an opponens piece which extends across the dorsal aspect of the hand, and a finger piece which places the index and middle fingers into partial flexion at the proximal interphalangeal joint (fig. 1).

The wrist cuff is entered through a narrow opening on its ulnar side. The elasticity of the plastic allows the opening to spring apart while the arm slips in, yet fits securely with the ulnar styloid acting as a locking prominence. The opponens piece wraps around the hypothenar pad and extends half-way across the palmar arch. Here it ends with a Velcro[2] Closure which the patient can close merely by pressing the two parts of the material together.

A dacron strap which passes between the proximal phalanx of the first and second fingers fastens the finger piece to the wrist cuff by means of a bird-cage snap. Extension of the wrist then will provide grasp between the thumb and index and middle fingers as well as a gross grasp utilizing the web space (fig. 2).

Method of Fabrication

The basic material used is a polyester resin. The splint is fabricated in a manner similar to that used in the construction of an artificial arm. The properties of this resin and fabrication technics are well documented in the *Manual of Upper Extremity Prosthetics.* Fabrication and fitting is done in the Rehabilitation Institute of Chicago Experimental Orthotics Laboratory.

Department of Occupational Therapy, Rehabilitation Institute of Chicago.
Chief, Department of Occupational Therapy, Rehabilitation Institute of Chicago.
Director, Rehabilitation Institute of Chicago.

Table 1

Patient No.	Diagnosis	Radial Wrist Extensors	Ulnar Wrist Extensors	Finger Extensors	Finger Extensors
1	Quad, C-6	G	G—	0	T
2	Quad, C-7	N	T	T	0
3	Quad, C-5	N	N	0	0
4	Quad, C-6 & 7	G	F	0	0
5	Quad, C-6	F—	0	0	0
6	Post Poliomyelitis	G	G—	G	0

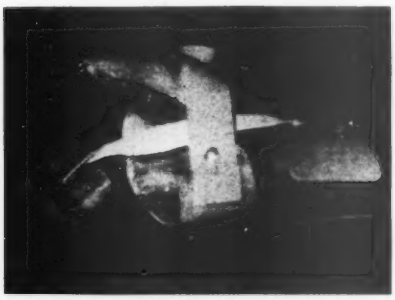

Figure 1

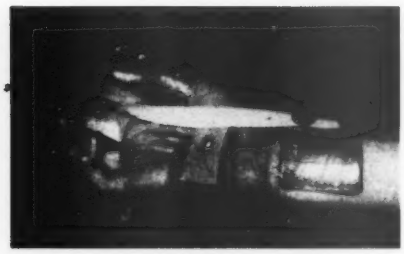

Figure 2

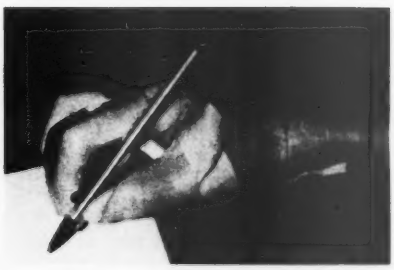

Figure 3

Training

Control and use training of the splint is accomplished by the staff occupational therapist using the RIC Skill Inventory and Achievement Record, which is also employed for prosthetic use training. Generally, 10 to 12 hours of training is required to explore the potentialities of the device and to assure its continued use.

Results

Of the six patients reported, five have completed the training phase. Patient No. 1 has had sufficient restoration of function so that the splint is no longer required. Patient No. 2 has achieved sufficient proficiency in writing with the splint to enable him to function adequately at the college level without a typewriter. Patient No. 3 uses the splint for feeding, but because of visual problems, is unable to use it for other activities. Patient No. 4 rejected this splint emotionally just as he had rejected all previous functional devices. Patient No. 5 uses the splint routinely for all writing required in the operation of his home telephone answering service (fig. 3).

Summary

In attempts to meet the three basic criteria for an ideal tenodysis splint — (1) minimal loss of power through friction; (2) cosmetic acceptability, and (3) self application — the use of polyester resin has been explored. It is felt that the RIC splint more nearly meets these criteria than does a metal splint. While clinical application to date has been limited, results have been sufficiently gratifying to merit more widespread consideration in hand disability problems.

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January 1, 1960 is the date

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Age and Sex Related Muscle Weakness

T. S. Danowski, M.D.
and
M. J. Wratney, R.P.T.
Pittsburgh

● Measurements of the performance of muscles against resistance and gravity in healthy children have revealed a relative weakness in the extrapelvic and pelvic groups in boys and girls 7 to 15 years of age. Thereafter, males attain maximal muscle strength in all groups, whereas a significant proportion of females aged 15 to 30 years manifest a weakness of the hip flexors, hip rotators, hip extensors, and the gluteus medius. It is suggested but not established that these age and sex variations in muscle strength are related to androgen-estrogen secretion. The presence of such weaknesses in a normal or average population must be taken into account in tests of muscle performance.

While trying to precipitate an attack of periodic paralysis in an 18-year-old female suspected of having such episodes spontaneously, we noted the weakness of the hip flexors which persisted unchanged during several months of followup. The demonstration that castration reduces the size[1] and the phosphorus content[2] of the pelvic-perineal muscles of rats and that such changes could be reversed by androgen therapy[2] raised the possibility that similar influences of sex hormones upon muscles exist in humans. Evaluation of muscle strength in children of both sexes and in normal adult males and females indicates that age- and sex-associated differences in muscle strength are indeed present.

Materials and Methods

The subjects ranged in age from 7 to 30 years and believed themselves to be in good health. The children and most of the teenagers were members of a well-run private institution; the remainder were student nurses, college undergraduates, and laboratory and office personnel.

The performance of muscle groups against gravity and resistance has been evaluated in a total of 160 normal males and females in accordance with the usual scale: Normal, indicating a complete range of motion against gravity with full manual resistance; Good, reflecting a complete range of motion against gravity with limited manual resistance; Fair, pointing to a complete range of motion against gravity with no resistance applied.[3] Gradings of plus or minus were used to indicate performance in the range between these groups. In testing these muscle groups, resistance was applied at the end of the range of motion, that is in a "break test," with the applied pressure opposing the line of pull of the muscle or muscles.

In the 7 to 16 year age group a total of 108 muscle groups were tested in each subject. In the older group complete examinations were performed in about one third. In the remainder only the performance of the hip flexors and extensors, the hip inward and outward rotators, the gluteus medius, and the tensor fasciae latae was tested as follows:

1. The iliacus and psoas major muscles which combine to flex the thigh upon the pelvis, that is, the hip flexors, were tested by having the subject sitting with the legs over the edge of a table. The subject braced the hands against the table while flexing the hip through the last part of the range of motion. Resistance was applied by the examiner directly above the knee joint.

2. External rotation of the hip, which is accomplished by the combined action of the obturatorius externus and internus, the quadratus femoris, the piriformis, and the gemellus superior and inferior, was also tested in the sitting position with the legs over the edge of a table and flexed to a right angle. The examiner stabilized the thigh at the lateral aspect of the knee joint and applied resistance above the ankle on the medial side.

3. The gluteus minimus, which is the internal rotator of the hip, was tested in the same manner as the external rotator group, except that the thigh was stabilized by fixing the medial aspect of the knee joint and resistance was applied above the ankle laterally.

4. Hip extension, with the knee straight, which is accomplished by the

From the Section of Endocrinology and Metabolism, University of Pittsburgh School of Medicine; and the Shadyside Hospital.

This study was supported by grants from the Muscular Dystrophy Associations of America, Inc., and the John A. Hartford Foundation.

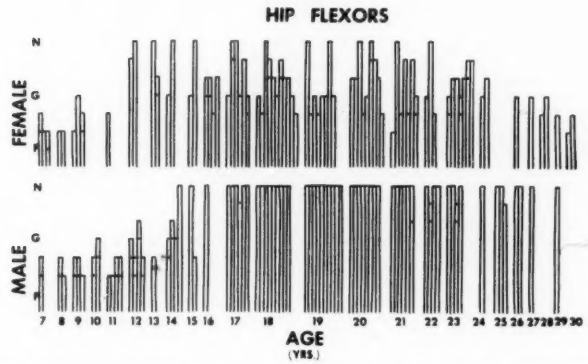

Fig. 1 — HIP FLEXORS: Only five males out of 57, 16 years of age or older, showed normal hip flexor strength in contrast to the weakness evident in approximately 85 per cent of the females. Prior to the age of 16, weakness under the test conditions employed, was present in both sexes.

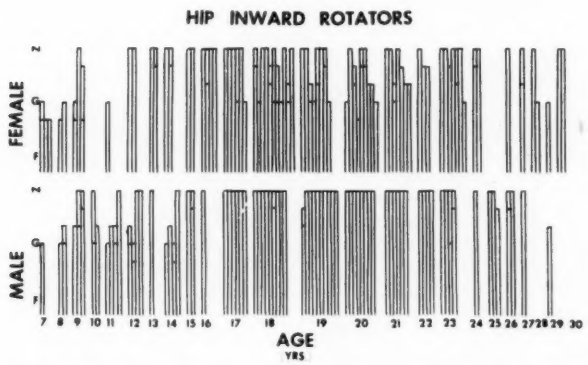

Fig. 2 — HIP INWARD ROTATORS: Muscle strength in the inward rotators of the hip in 55 males and 63 females age 16 and older. Only seven males had slight weakness of the inward rotators contrasted with similar or greater degrees of weakness in 36 females. Also, the weakness present in the children of both sexes below the age of 16 is again to be noted.

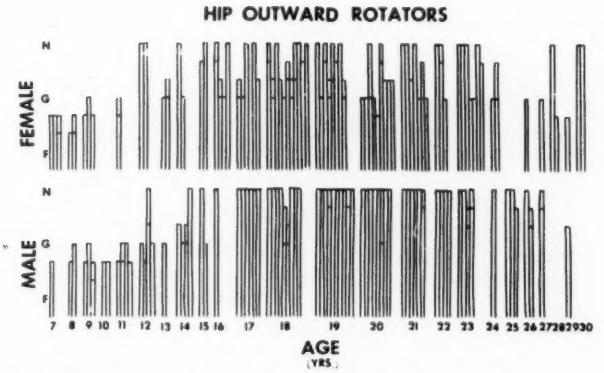

Fig. 3 — HIP OUTWARD ROTATORS: Again, as in figures 1 and 2, testing showed a larger proportion of females than males in the 16-year-old age groups with less than normal ratings in the performance of the outward rotators of the hip. Weakness was evident in both sexes in the 7 to 16 year age group.

gluteus maximus, the semitendinosus, semimembranosus, and the long head of the biceps femoris, was evaluated in the prone position, with the knee straight and the subject moving the hip through the full range of motion. Resistance was applied just above the knee joint.

5. The tensor fasciae latae which abducts the hip when the leg is in advance of the body line, that is, in the flexed position, was tested with the subject lying on one or the other side. The bottom leg was slightly flexed at hip and knee and the top leg held with the knee straight at the full 45 degrees forward of the body line. The subject then abducted the leg through the full range of motion and resistance was applied just above the lateral aspect of the knee joint.

6. Abduction of the hip from a position posterior to the line of the body which is accomplished by the gluteus medius muscle was tested in the same position as in the tensor fasciae latae test, but the top leg was first brought back and then abducted through the range of motion. In this position resistance was applied to the lateral aspect of the thigh just above the knee joint.

Results

The findings indicate that up to the age of 14 or 15 weakness or less than maximal performance of the skeletal muscles, in general, as well as of the pelvic group, is frequent in both boys and girls. Because of space limitations, the data on the extrapelvic muscles have not been presented graphically but the differences resemble those seen in the pelvic group.

In males age 16 or older, pelvic and extrapelvic muscle performance against gravity or resistance was maximal on the usual rating scale. In females, on the other hand, though only occasional weakness of the extrapelvic musculature was noted, the performance of the hip flexors, outward and inward rotators, and extensors, and the gluteus medius was found to be reduced to 75 or 50 per cent of normal or less in one third to one half of the subjects. The tensor fasciae latae appeared to be equally strong in both sexes (figs. 1 through 6).

Discussion

Even though objective measurements are lacking, and resistance during the examination was applied by an adult examiner, it is quite definite that children do not attain normal adult standards of muscle performance until the early teens.

The finding of a sex difference in muscle strength in males and females above the age of 15 raises the possibility that the greater androgenic output or the lesser secretion of estrogens in the male after pubescence is responsible for the increased muscle strength. This relationship would be in keeping with the studies in animals.[1, 2] It is true, of course, that other factors may also be responsible, such as the degree of physical activity in the two sexes.

These findings have a practical significance. It is obvious that the performance of at least certain muscle groups may be less than normal in some age and sex groups, an important fact to be kept in mind in seeking weakness in diseases such as muscular dystrophy, or other myopathies or neuropathies. Also, if the sex differences are androgen-estrogen determined, it is possible that changes in muscle performance may be encountered in gonadal or adrenogenital disorders.

Summary and Conclusions

Measurements of the performance of muscles against resistance and gravity in healthy children have revealed a relative weakness in the extrapelvic and pelvic groups in boys and girls 7 to 15 years of age. Thereafter, males attain maximal muscle strength in all groups, whereas a significant proportion of females aged 15 to 30 years manifest a weakness of the hip flexors, hip rotators, hip extensors, and the gluteus medius.

It is suggested but not established that these age and sex variations in muscle strength are related to androgen-estrogen secretion.

The presence of such weaknesses in a normal or average population must be taken into account in tests of muscle performance.

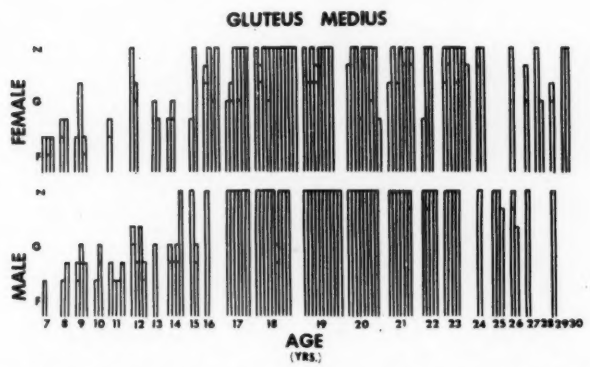

Fig. 4 — GLUTEUS MEDIUS: Though not as definite as in the muscle groups recorded in figures 1, 2, and 3 there is a greater proportion of less than normal ratings in females 16 years of age and older in these tests of gluteus medius performance. Children of both sexes show definite weakness under the conditions of these tests until they reach the early teens.

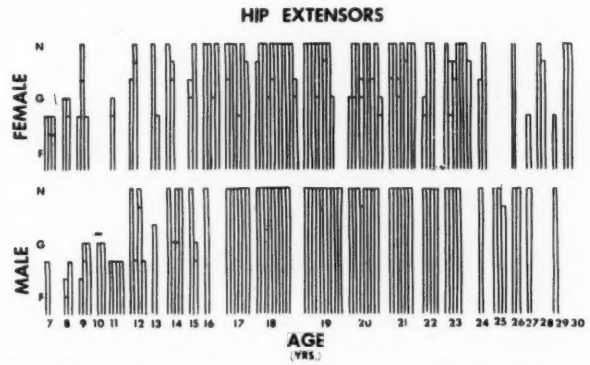

Fig. 5 — HIP EXTENSORS: Certain females age 16 or older but practically no males in this age range show below normal gradings in the performance of the hip extensor group of muscles against gravity and resistance. Males and females below this age often rate one-half or less of full strength.

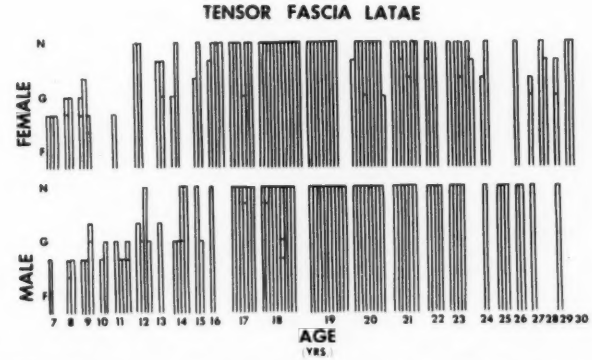

Fig. 6 — TENSOR FASCIA LATAE: In contrast to the muscle groups shown in the preceding figures comparisons reveal but little if any difference in the strength of the tensor fascia latae in males and females in the 16 to 29 year age range. Also, equivalent degrees of weakness are evident in children 15 years of age and younger.

Acknowledgment: We are indebted to the Protestant Home for Children and to Drs. Auleene M. Jamison and H. C. Carlson of the University of Pittsburgh for their cooperation in these studies.

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Important Announcement —

The next examinations, written and oral, of the American Board of Physical Medicine and Rehabilitation will be held in New York City, June 17 and 18, 1960. The final date for filing application is February 15, 1960. Write to the Secretary, Dr. Earl C. Elkins, 200 First Street S. W., Rochester, Minnesota, for application.

May We Present . . .

FREDERIC J. KOTTKE, M.D.

. . . the President of the American Congress of Physical Medicine and Rehabilitation for 1959-60, Doctor Frederic J. Kottke of Minneapolis.

Dr. Kottke assumed his presidential duties at the recent Congress meeting in Minneapolis. He was president-elect during the preceding year. Dr. Kottke was welcomed to office by the retiring president, Dr. Arthur C. Jones of Portland, Oregon.

Doctor Kottke was born on May 26, 1917, in Hayfield, Minnesota. He is currently a resident of Minneapolis. In 1941 he received an M.S. degree in Physiology; in 1944 he received a Ph.D. in Physiology, and in 1945 he received the degree of Doctor of Medicine. All these degrees were conferred upon him by the University of Minnesota. Doctor Kottke was also a Baruch Fellow in physical medicine and rehabilitation for the period 1946 through 1948. He was licensed to practice medicine in the State of Minnesota in 1947.

As a prelude to his current academic appointment as Professor and Head, Department of Physical Medicine and Rehabilitation at the University of Minnesota, he served as instructor in Physiology; Assistant Professor Physical Medicine, and Associate Professor Physical Medicine all at the University of Minnesota. He was certified as a Diplomate of the American Board of Physical Medicine and Rehabilitation in 1949.

He was admitted to Fellowship in the American Academy of Physical Medicine and Rehabilitation on August 28, 1952. He is currently serving on the Editorial Board of the

ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION as well as on the Editorial Board of *Modern Medicine*.

Doctor Kottke's membership affiliations in professional and scientific organizations include the Minnesota State Medical Association; American Medical Association; American Physiological Society; Society for Experimental Biology and Medicine; Sigma Xi; American Association of University Professors; American Association for the Advancement of Science; New York Academy of Science, and the National Rehabilitation Association.

Since 1941, Doctor Kottke has authored and/or co-authored approximately 60 scientific articles for publication in various medical and scientific journals.

CLARENCE W. DAIL, M.D.

". . . the President of the American Academy of Physical Medicine and Rehabilitation for 1959-60, Doctor Clarence W. Dail of Los Angeles.

Dr. Dail assumed his presidential duties at the recent Academy assembly in Minneapolis. He was president-elect during the preceding year. Dr. Dail was welcomed to office by the retiring president, Dr. Louis B. Newman of Chicago.

Dr. Dail was born on July 7, 1907, in Germany but has lived most of his life in California. He received the degree of Doctor of Medicine in 1935 from the College of Medical Evangelists in Los Angeles. His professional affiliations include service as Consultant in Physical Medicine, Rancho Los Amigos, Downey, California; Senior Staff, White Memorial Hospital, Los Angeles; Attending Staff, Los Angeles County Hospital, Los Angeles, and Associate Professor of Physical Medicine and Rehabilitation, School of Medicine, College of Medical Evangelists.

He was admitted to Fellowship in the American Academy of Physical Medicine and Rehabilitation on September 2, 1940. He became a Diplomate of the American Board of Physical Medicine and Rehabilitation on August 31, 1947. Dr. Dail is a member of the American Congress of Physical Medicine and Rehabilitation as well as a member of the American Medical Association.

In addition to his busy professional life, he has written numerous articles which have been published in various medical and scientific journals.

WILLIAM J. ERDMAN, II, M.D.

. . . the fifth vice-president of the American Congress of Physical Medicine and Rehabilitation, Doctor William James Erdman, II of Philadelphia.

The members of the Congress are pleased to acquaint you with their newest officer and member of the Board of Governors. Dr. Erdman was born on April 8, 1921, in Philadelphia. He attended the Germantown Friends School, Swarthmore College and Virginia Polytechnic Institute; he received his medical degree in 1950 from the University of Pennsylvania.

He is currently Associate Professor of Physical Medicine and Rehabilitation as well as Chairman of the Department of Physical Medicine and Rehabilitation, School of Medicine at the University of Pennsylvania. Dr. Erdman is similarly affiliated with the Graduate School of Medicine of the University of Pennsylvania.

His membership in medical and scientific societies includes the American Academy of Physical Medicine and Rehabilitation; American Medical Association; Pennsylvania State Medical Association; Pennsylvania Academy of Physical Medicine; American Association for the Advancement of Science; Franklin Institute; American College of Physicians, and College of Physicians of Philadelphia. Dr. Erdman also represents the American College of Physicians on the Advisory Board of the American Registry of Physical Therapists. He became a diplomate of the American Board of Physical Medicine and Rehabilitation in 1956.

PHYLLIS ANN HUENE, M.D.

. . . the recipient of the Bernard M. Baruch Essay Award, Doctor Phyllis Ann Huene,

for the paper "Use of Anticoagulants in Cerebral Thrombosis." Born in New York City on January 24, 1935, Dr. Huene was educated at Mount Holyoke College and received her medical degree from New York Medical College. She is currently serving a rotating internship at Community Hospital of Glen Cove, Glen Cove, N. Y.

. . . the recipient of the 1959 Essay Award, Doctor Walter C. Stolov, for the paper "Rehabilitation of the Bladder in Injuries of the Spinal Cord." Born in New York City on January 6, 1928, Dr. Stolov was educated at the City College of New York and at the University of Minnesota where he also received his medical degree. In 1955 he was an Elizabeth Kenny Foundation Fellow in Physical Medicine and Rehabilitation; in December 1957, he was appointed a National Foundation Fellow in Physical Medicine and Rehabilitation. Dr. Stolov is currently affiliated with the University of Minnesota Medical School.

WALTER C. STOLOV, M.D.

Awards to Scientific Exhibitors

The Committee on Awards for Scientific Exhibits presented through its Chairman, Dr. David M. Paul, the following:

Gold Medal to Heinz I. Lippmann, M.D., and Ralph R. Goldin, M.D., for the exhibit "Subcutaneous Ossification of the Legs."

Silver Medal to Jerome S. Tobis, M.D.; Joseph Rogoff, M.D.; Earl F. Hoerner, M.D., and Stuart Reiner, E.E., for the exhibit "Pain and Weakness: Electrical Diagnostic Evaluation."

Bronze Medal to Eugene G. Lipow, M.D.; Charles S. Wise, M.D., and Charles R. Peterson, M.D., for the exhibit "Traumatic Conditions of the Shoulder."

Honorable Mention to Saul Machover, M.D., and Harold M. Robinson, for the exhibit "An Historical Panorama of Physical Medicine and Rehabilitation."

Honorable Mention to William M. Bernstock, and Harold W. Glattly, M.D., for the exhibit "Clinical Prosthetics" (Courtesy of Veterans Administration and Committee on Prosthetics Education and Information of National Academy of Sciences).

Award of Merit for the Year 1959

The Committee on Gold Key Award presented through its chairman, Dr. Donald A. Covalt, the distinguished service key to:

FRED B. MOOR, M.D.

FRED B. MOOR, M.D. — *Physician, Educator and Humanitarian: Who has earned the respect of his associates by his wisdom, counsel, good-will and fellowship; who has rendered great service to the field of physical medicine and rehabilitation through his services as enthusiastic worker thereby making him representative of outstanding leadership in physical medicine and rehabilitation; who, by his tireless efforts and many accomplishments has notably advanced the Science and the Art of Physical Medicine and Rehabilitation.*

Dr. Fred B. Moor was born on October 14, 1893 in Lidgerwood, North Dakota. He received his M.D. degree in 1920. He had taken his medical training at the University of North Dakota and the School of Medicine, College of Medical Evangelists at Loma Linda and Los Angeles, California. Dr. Moor had also attended additional post-graduate courses at the University of Chicago, Battle Creek Sanitarium and Harvard University (Peter Bent Brigham Hospital).

Dr. Moor was certified by the American Board of Physical Medicine and Rehabilitation on August 31, 1947. He served as President of the American Congress of Physical Medicine and Rehabilitation in 1942.

As a member of the Board of the American Registry of Physical Therapists, Dr. Moor served for the period from 1939 to 1952. He also was a member of the Editorial Board of the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION from 1941 to 1959. In addition to these duties, he served as officer of his regional section of the American Congress of Physical Medicine and Rehabilitation, as well as chairing many of the standing committees of the Congress since he was first admitted to membership. Dr. Moor is a charter member of the American Academy of Physical Medicine and Rehabilitation, and was its President in 1944-1945. He also holds membership in the American Medical Association.

He is currently serving as Professor of Physical Medicine and Rehabilitation, School of Medicine, College of Medical Evangelists, as well as Medical Director, School of Physical Therapy at the College of Medical Evangelists.

medical news

Readers are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before date of meeting.

New Academy Members

At the 1959 annual meeting of the American Academy of Physical Medicine and Rehabilitation, the following individuals were admitted to membership. Classification of membership follows each name:

Baer, Richard F. (*Fellow*), 2740 W. Central Ave., Toledo, Ohio

Bendler, Eleanor M. (*Fellow*), Hospital of the Univ. of Pa., 3600 Spruce St., Philadelphia

Blanchard, Russell S. (*Fellow*), Rehabilitation Institute of Metropolitan Detroit, 8811 Hamilton Ave., Detroit

Borken, Norman (*Fellow*), 1502 Lenox Ave., Miami Beach, Fla.

Brist, F. Manley (*Honorary*), 1402 E. First Nat'l. Bank Bldg., St. Paul

Bugel, Harry J. (*Fellow*), PM&R Service, VA Hospital, Nashville, Tenn.

Chen, Li-Ching Yen (*Fellow*), PM&R Service, VA Hospital, New York City

Cornman, Tillye (*Fellow*), Clinical Center, Nat'l. Institutes of Health, Bethesda, Md.

Coyne, Nadene (*Fellow*), Institute of PM&R, 400 E. 34th St., New York City

Dacso, Michael M. (*Fellow*), 1082 Park Ave., New York City

De Gravelles, William D., Jr. (*Fellow*), Duke Hospital, Box 3215, Durham, N. C.

Fleming, William C. (*Fellow*), PM&R Service, VA Hospital, Richmond, Va.

Forster, Sigmund (*Fellow*), 1325 E. 23rd St., Brooklyn

Fountain, Freeman P. (*Fellow*), United Cerebral Palsy of Louisville, 600 E. Broadway, Louisville, Ky.

Freed, Murray M. (*Fellow*), 55 Stoughton St., Boston

Gersten, Jerome W. (*Fellow*), Univ. of Colorado Med. Ctr., 4200 E. Ninth Ave., Denver

Gregg, Robert A. (*Fellow*), 3411 Cloverdale Dr., Greensboro, N. C.

Haak, Edward D. (*Fellow*), Georgia Warm Springs Fdn., 519 Pine Rd., Warm Springs, Ga.

Haase, Karl H. (*Fellow*), 7743 Yarmouth Ave., Reseda, Calif.

Krout, Robert (*Fellow*), 6 Ridge Road, Hanover, N. H.

Lehmann, Justus F. (*Fellow*), 24127 102nd Pl. W., Edmonds, Wash.

Liao, Sung J. (*Fellow*), Dept. of PM&R, Waterbury Hospital, Robbins St., Waterbury, Conn.

Lindenauer, Harold J. (*Fellow*), PM&R Service, VA Hospital, Bronx, N. Y.

Lorenze, Edward J. (*Fellow*), Burke Foundation, 785 Mamaroneck Ave., White Plains, N. Y.

McGovern, Richard E. (*Fellow*), St. Joseph's Hospital, 350 W. Thomas Rd., Phoenix, Ariz.

Michela, Bernard J. (*Fellow*), Rehabilitation Institute of Chicago, 401 E. Ohio St., Chicago

Miller, Robert V., Jr. (*Fellow*), Beverly Hills Medical Clinic, 133 S. Lasky Dr., Beverly Hills, Calif.

Montero, Jose C. (*Fellow*), 2636 Montana St., Oakland, Calif.

Paul, David M. (*Fellow*), PM&R Service, VA Hospital, Iowa City

Posniak, Abraham O. (*Fellow*), 143-16 Barclay Ave., Flushing, N. Y.

Rusk, Howard A. (*Fellow*), Institute of PM&R, 400 E. 34th St., New York City

Saldias, Ernesto G. (*Corresponding*), Providencia 835 Dep. 47, Santiago, Chile, S. A.

Sheffield, Frederick J. (*Fellow*), PM Service, Madigan Army Hospital, Tacoma, Wash.

Smith, Erma A. (*Fellow*), PM&R Service, VA Hospital, Cleveland

Sokolow, Jack (*Fellow*), Director, Dept. of PM&R, City Hospital at Elmhurst, Elmhurst, N. Y.

Stillwell, Dorothy M. (*Fellow*), Dept. of PM&R, Univ. of Colorado Med. Ctr., 4200 E. Ninth Ave., Denver

Treanor, Walter J. (*Fellow*), St. Mary's Hospital, 2200 Hayes St., San Francisco

Wasserman, Reuben R. (*Fellow*), 2754 W. Rascher Ave., Chicago

Yue, Shyh-Jong (*Fellow*), 630 W. 168th St., New York City

New Congress Members

The following individuals were officially elected to membership in the American Congress of Physical Medicine and Rehabilitation. Membership classification immediately follows each name:

Anderson, Albert D., M.D., (*Active*), 1341 Franklin Ave., Bronx, N. Y.

Berg, Harry E., M.D. (*Active*), 2250 Clarendon Rd., Brooklyn
Bowman, John R., M.D. (*Affiliate*), Unit 11, Box 206, Ft. Logan, Colo.
Bridges, Jack A., M.D., (*Affiliate*), 5441 S. W. Hamilton St., Portland, Ore.
Brist, F. Manley (*Honorary*), 1402 E. First Nat'l. Bank Bldg., St. Paul
Butler, Leo J., M.D. (*Active*), 1035 San Antonio Ave., Alameda, Calif.
Castro, Marcio L., M.D. (*Active*), 904-B Horizonte, Minas, Brazil, S. A.
Conlen, Richard A., M.D. (*Affiliate*), 640 Farragut Ave., Haddonfield, N. J.
Cress, Robert H., M.D. (*Active*), VA Hospital, Durham, N. C.
Cutler, Bernard, M.D. (*Active*), 157 Hoyt St., Brooklyn
Feldman, Harold H., M.D. (*Active*), 2606 E. 24th St., Brooklyn
Fixel, Irving E., M.D. (*Active*), 3705 Hollywood Blvd., Hollywood, Fla.
Ginzburg, Mejer, M.D. (*Active*), 1501 Eastern Pkwy., Brooklyn
Gucker, Thomas, III, M.D. (*Active*), 2400 S. Flower St., Los Angeles
Haak, Edward D., M.D. (*Active*), Georgia Warm Springs Fdn., Warm Springs, Ga.
Hamel, John F., M.D. (*Active*), 168 Charlotte St., Ottawa, Ont., Canada
Hughes, Alfred C. R., M.D. (*Affiliate*), 1333 Barry Ave., West Los Angeles
Kara, Anna, M.D. (*Active*), 535 E. 70 St., New York City
Linden, Jack L., M.D. (*Active*), State Veterans Hospital, Rocky Hill, Conn.
Mikkelson, Vernon E., M.D. (*Affiliate*), 3561 S. W. Cherokee Ct., Oswego, Ore.
Modaff, Walter L., M.D. (*Affiliate*), 2806 W. Pierce St., Milwaukee
O'Loughlin, Peter D., M.D. (*Affiliate*), VA Hospital, Wood, Wis.
Pesch, Roger N., M.D. (*Active*), 610 Paseo De La Cuma, Santa Fe, N. M.
Ralph, Alice L., M.D. (*Affiliate*), 19 Green Hill Lane, Philadelphia
Reinherz, Albert, M.D. (*Active*), Box 37, Tavernier, Fla.
Reynolds, Glenn G., M.D. (*Active*), 7600 Carroll Ave., Takoma Park, Md.
Richardson, Paul F., M.D. (*Active*), 5908 Oakland Rd., Baltimore
Rodriguez, Miguel J., M.D. (*Affiliate*), 11811 Ohio Ave., Los Angeles
Roger, Mercedes S., M.D., (*Affiliate*), Box 3163, San Juan, P. R.
Ruiz, Carlos B., M.D. (*Active*), Contumaza 972, Lima, Peru, S. A.
Sandler, Bernard, M.D. (*Active*), 132 Cecil St., S. E., Minneapolis
Scott, Floyd E., M.D. (*Active*), VA Hospital, American Lake, Wash.
Sponsel, Kenath H., M.D. (*Active*), 605 Tenth Ave., S., Minneapolis
Steinberg, Franz U., M.D. (*Active*), 216 S. Kingshighway Blvd., St. Louis
Sterling, Harold M., M.D. (*Active*), Joseph P. Kennedy, Jr. Memorial Hospital, Brighton, Mass.
Stern, David, M.D. (*Affiliate*), 400 Deming Pl., Chicago
Stoner, Max A., M.D. (*Affiliate*), 2925 Mapleshade Rd., Ardmore, Pa.
Untereker, John J., M.D. (*Active*), 93 Palmer Ave., Tenafly, N. J.
Vizzard, Joseph N. M.D. (*Affiliate*), PO Box 428, Lafayette, Calif.
Yue, Shyh-Jong, M.D. (*Active*), 630 W. 168th St., New York City
Zohn, David A., M.D. (*Affiliate*), 3200 Cheviot Vista Pl., Los Angeles

Personals

: : illinois

= At its annual meeting in Milwaukee, on April 17, 1959, the Chicago Society of Physical Medicine and Rehabilitation held its annual election. The results of this election were as follows: Vice-president elect — *Louis Schwartz,* Chicago; Secretary-Treasurer elect — *Bernard J. Michela,* Chicago, and Board of Trustees elect — *Wladimir T. Liberson,* Hines. These men will assume office on January 1, 1960.

= "Physiological Approach to the Regulation of Activity," was presented at the Forty Second Annual Conference, American Occupational Therapy Association, by *Edward E. Gordon,* Chicago, and *Janet M. Anderson,* Chicago, held October 15 to 23, 1959 at the Hotel Morrison in Chicago.

= At the Conference on Aging, held at the Leland Hotel in Springfield on September 27, *Edward E. Gordon,* Chicago, presented "Rehabilitation of the Chronically Ill Aged" to the group.

: : iowa

= *William D. Paul,* Iowa City, headed a panel on arthritis and rheumatism at a public forum held in Council Bluffs on September 8.

: : michigan

= A Symposium on Clinical Medicine and Surgery, was announced by the Grand Traverse-Leelanau-Benzie, County Medical Society, and the *American Academy of Physical Medicine and Rehabilitation* as being held on Friday, October 23, 1959 at the Park Place Hotel, Traverse City.

: : minnesota

= *Frank H. Krusen,* Rochester, was appointed special assistant for health and medical affairs to the director of the Office of Vocational Rehabilitation, as announced by Arthur S. Flemming, Secretary of the Department of Health, Education and Welfare. He assumed this position in mid-September on leave from the Mayo Clinic where he is senior consultant in physical medicine and rehabilitation.

: : new york

= *Daniel J. Feldman,* New York, participated as panelist in the Symposium on Alcoholism, presented at the Westchester Academy of Medicine's Section Meeting, sponsored jointly by the Section on General Practice of the Westchester Academy of Medicine, the Westchester Chapter of American Academy of General Practice and the Committee on Alcoholism of the Mental Health Association of Westchester County.

= Twelve physicians were included among the 130 persons named to the National Advisory Committee for the White House Conference on the Aging scheduled for January, 1961. Former Republican Rep. Robert W. Kean heads the committee which also includes representatives from business, labor, agriculture, public and private organizations and the legal profession. Included among the physicians on the committee is *Howard A. Rusk,* Scarsdale, Director, Institute of Physical Medicine and Rehabilitation, Bellevue Medical Center.

= *Dr. Rusk,* a Sommer Memorial Lecturer, spoke on the "Dynamic Therapeutics in Chronic Disease" at the 12th annual session of the Northwest Regional Academy Meeting. Adopted as their theme was the horse and buggy doctor in celebration of Oregon's 100th birthday as a state. This meeting was presented in conjunction with the Sommer Memorial Lectures held at Portland State College Center.

= Dedication ceremonies opening the new $500,000 Maurice B. Hexter Rehabilitation Wing at Beth Abraham Home for the Chronic Ill were held June 23, 1959. Undertaken at the suggestion of *Dr. Rusk,* the program provides 1,856 beds in five separate institutions located in different parts of the city.

= For most of his life, *George G. Deaver,* New York, has concentrated on rehabilitation of the handicapped and, in so doing, has contributed his special knowledge to the technics now widely used. Professor of Clinical Rehabilitation and Physical Medicine at the NYU College of Medicine, he is nearing the retirement age but, when he leaves the NYU post in July, 1960, he does not intend to be idle. He will continue as Director of the Department of Physical Medicine and Rehabilitation at Lenox Hill Hospital in New York and as consultant to several cerebral palsy centers.

= The Program of the Symposium on the Prevention and Treatment of Athletic Injuries held at the University of Rhode Island, Kingston, August 17-18, 1959 included as one of its speakers, *George G. Deaver,* New York, who spoke on "Physical Medicine in the Treatment of Athletic Injuries."

Age and Hearing

The recent report by the National Association of Manufacturers that older persons will have greater job opportunities in the next decade is seen by the hearing aid industry as containing an ominous portent. Though hailing the report as a realistic and valuable appraisal, the industry's association, the Hearing Aid Industry Conference, states that unless a broad-scale attack is made on the refusal of thousands of persons to use prosthetic devices, the entire economy will suffer.

The N.A.M. report stated that the older job seeker often puts obstacles in his own path by taking a defeatist attitude that employers want only younger workers. While agreeing that this morale factor is highly pertinent, the H.A.I.C. believes that at least equally important is the fact that many older workers, though in good health, cannot offer an employer their full capabilities because they have not procured hearing aids.

In the over-55 age bracket covered by the N.A.M. report, it is estimated that only *one million* have hearing aids, while *five million* need them. The difficulty of communicating with such persons diminishes their value greatly, even if they remain on the payroll and the cold facts of economics make it necessary for employers to lay off or refuse to hire many thousands of such persons. This problem will get worse unless positive action is taken. The combination of a longer life span and the low birth rate during the 1930's will make business even more dependent on the older worker in the next ten years; yet the gradual diminishment of hearing is most prevalent in this very age group. Unless the worker himself and the business community become more alert to the possible consequences, a tragic misuse of ability and knowledge will result.

Hearing conservation programs must be instituted by employers. Routine hearing tests will turn up many cases of failing hearing at an early stage and make them easy to cope with, so there will be no loss of productivity or personal income. In many communities, the member agency of the American Hearing Society, a non-profit organization, is equipped to offer test facilities or guidance for the employer on setting up his own facilities. It was emphasized that unless such tests are done on a regular compulsory basis, they will have no appreciable effect. Also seen as vital was a follow-up program that would act to guide employees, according to test results.

The conservation of hearing is at once one of the most neglected industrial programs and one of the most rewarding. Those few companies that have instituted them have experienced gratifying results. In most cases, such programs are very inexpensive and take little time to conduct.

The N.A.M. report that prompted the hearing aid trade group declaration was made to the Senate Labor Committee's subcommittee on problems of the aging.

ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION

OFFICIAL JOURNAL

AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION

AMERICAN ACADEMY OF PHYSICAL MEDICINE AND REHABILITATION

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VOLUME 40 — January-December, 1959, Inclusive

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This is a subject index and one should, therefore, look for the subject word, with the following exceptions: "Book Reviews" and "Deaths," are indexed under these titles at the end of the letters "B" and "D." The name of the author, in brackets, follows the subject entry. If there are more than two authors, only the name of the first author is given.

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The Officers of the

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THEIR VERY BEST WISHES

for a

Merry Christmas and a Happy New Year

ABSTRACTS

The following abstracted articles have been published in the January-December, 1959 issues of the journal.

JANUARY

The Practice of Physical Medicine and Rehabilitation. D. L. Rose. *(pp. 1-7; 1 table)*

● One aspect of physical medicine and rehabilitation, namely its "practice" is outlined. A basic background history of the American Congress of Physical Medicine and Rehabilitation is outlined which includes evolution of the term physiatrist. The specialty and relationship with paramedical groups are discussed in detail. The need for physiatrists, their recruitment and training is stressed. Self-evaluation of current programs in this specialty is considered important. The newly adopted Principles of Practice of the American Congress of Physical Medicine and Rehabilitation are introduced.

Requests for reprints and/or information should be directed to: Donald L. Rose, M.D., University of Kansas Medical Center, Kansas City 12, Kans.

Trochanteric Bursitis: Management. R. M. Krout and T. P. Anderson. *(pp. 8-14; 5 tables)*

● A previous report by one of us (T.P.A.) presented the criteria for the diagnosis of chronic trochanteric bursitis of the hip. It was shown that in more than 50 per cent of the cases the bursitis is associated with some other painful condition in the same lower extremity or the back. An analysis of the methods of management of 50 cases of chronic trochanteric bursitis is presented. The various forms of treatment for the bursitis per se are compared. Special reference is made to the management of that group of cases in which the bursitis is associated with some other condition. Emphasis is placed on the necessity for correction of the associated situation as an integral part of the treatment of the bursitis. Several illustrative case histories are included.

Requests for reprints and/or information should be directed to: Robert M. Krout, M.D., Hitchcock Clinic, Hanover, N. H.

Plantar Wart Treatment with Ultrasound. H. Kent. *(pp. 15-18; 1 figure)*

● The methods of treating plantar warts are almost legion, but with the advent of ultrasonic therapy, there is now a mode which may resolve the disadvantages of other methods. This is a preliminary report of nine patients with plantar warts whose duration ranged from one month to thirteen years and who received ultrasonic therapy with what may be described as spectacular results. All patients but for one were relieved of their discomfort with disappearance of lesions. No recurrences have occurred although insufficient time has elapsed for ascertaining a "cure."

Requests for reprints and/or information should be directed to: Herbert Kent, M.D., 6213 N.W. Grand Blvd., Oklahoma City 12, Okla.

An Appraisal of American Training in Physical Medicine and Rehabilitation for Foreign Medical Personnel: Retrospect and Aftermath. L. P. Cajoleas; D. J. Feldman, and H. A. Rusk. *(pp. 19-25)*

● This pilot study of a small group of international medical trainees who received specialized training under the auspices of one American center suggests the need for additional research into the nature, problems, and outcomes of cross-cultural training for foreign medical personnel. It may be concluded that international trainees generally benefited from their professional training in the United States.

Requests for reprints and/or information should be directed to: Howard A. Rusk, M.D., Institute of Physical Medicine and Rehabilitation, 400 East 34th St., New York 16, N. Y.

Case Report: Rehabilitation of Patient with Paralysis and Advanced Flexion Deformities of Lower Extremities. S. Olejniczak and W. W. Glas. *(pp. 26-28; 2 figures)*

● This is a case report of a patient who was bedfast from the disabilities of multiple sclerosis. He had experienced paralysis and flexion contractures of both lower extremities, loss of sensation below the 10th dorsal segment, sacral and gluteal decubiti, and loss of bladder and bowel control. There was marked apathy, depression, and associated malnutrition. After bilateral hip disarticulation, closure of the decubiti, cystostomy, intensive physical therapy and occupational therapy was instituted. These efforts resulted in a satisfactory rehabilitation of this patient. Follow-up visits show that the patient and the family are adjusted to the disability, and the patient continues to do well on the home program that was initiated at the hospital.

Requests for reprints and/or information should be directed to: Wayne W. Glas, M.D., Director of Surgery, Wayne County General Hospital, Eloise, Mich.

A Work Adjustment Center in Vocational Rehabilitation. J. L. Rudd and S. N. Feingold. *(pp. 29-34)*

● This study discusses a particular type of workshop or work adjustment center representative of many now being established in various parts of this country. Workshops, as part of the community counseling and placement agency, have demonstrated a new and steady growth in the vocational guidance field. It is in this area that some of the best results in vocational rehabilitation have been achieved within the last decade. This type of workshop is most useful when the pattern of the individual's work behavior cannot be assessed through other technics or when special aspects of vocational activities must be developed or observed. Executives concerned with employment of personnel have expressed wonderment at the productivity and creativity of the handicapped. This makes forceful the statement "employ the handicapped — it's good business."

Requests for reprints and/or information should be directed to: Jacob L. Rudd, M.D., 481 Beacon St., Boston 15, Mass.

FEBRUARY

Certain Experimental Observations on a Pulsed Diathermy Machine. A. Wildervanck; K. G. Wakim; J. F. Herrick, and F. H. Krusen. *(pp. 45-55; 8 figures)*

● The primary objective when studying pulsed alternating currents generated by the equipment known as the "diapulse machine" was the determination of temperatures which could be produced in ground horse meat and in the thigh of the living animal (the dog). The secondary objective was to study the phenomenon which has been called "pearl-chain formation" by those who have described this observation previously. Finally, in order to learn whether or not these effects were peculiar to the intermittent short-wave machine under study, a comparative study was made by use of the well-known medical diathermy equipment which generated alternating currents continuously and at the same frequency. Significant rises in temperature were produced during an exposure time of 20 minutes to the diapulse machine when the controls were set at the two highest outputs. When the controls were set at lower positions and when the exposure time was 20 minutes, no rise in temperature was observed by the method employed for measuring temperatures, namely, the thermistors, and under the experimental conditions described. Similar rises in temperature could be obtained with continuously generated alternating currents when the output was properly adjusted. The pearl-chain formation was demonstrated as easily with very low outputs of the standard diathermy equipment as with the diapulse machine. The heating pattern of the

diapulse machine was determined by two different methods, that is by the egg-white method in which the egg is coagulated by heat and by a method in which color changes occur with suitable rises of temperature.

Requests for reprints and/or information should be directed to: Section of Publications, Mayo Clinic, 200 First St., S.W., Rochester, Minn.

Cortical Sensory Defects Causing Disability. F. M. Forster and C. D. Shields. *(pp. 56-61; 3 figures)*

● Consideration of sensory defects as a major factor in producing disability and handicap is important. The need for careful sensory evaluation and specific therapy aimed at the retraining of the patient in the sensory aspects is emphasized.

Requests for reprints and/or information should be directed to: Charles D. Shields, M.D., Professor & Chairman, Department of Physical Medicine and Rehabilitation, Georgetown University Medical Center, Washington 7, D. C.

and/or

Francis M. Forster, M.D., Professor & Chairman, Department of Neurology, University of Wisconsin School of Medicine, Madison, Wis.

Etiology and Pathology of Ischemic Ulcers. M. Kosiak. *(pp. 62-69; 3 figures)*

● Ischemic ulcers in dogs were produced by both high pressures applied for short durations or low pressures applied for long durations. The time-pressure relationship is inverse and follows a parabolic curve. Microscopic pathologic changes were noted in tissue subjected to as little as 60 mm. Hg for only 1 hour. Skin and subcutaneous tissue normally exert a sling or suspension effect, with the result that only a fraction of the applied pressure is transmitted to the deep tissue. Because living tissue is so sensitive to the ischemia produced even by very low external pressures, temporary relief of this pressure every few minutes is essential.

Requests for reprints and/or information should be directed to: Michael Kosiak, M.D., Department of Physical Medicine and Rehabilitation, 860 University of Minnesota Medical Center, Minneapolis 14, Minn.

Acute Cerebrovascular Accidents: Statistical Considerations, Diagnostic Methods and Treatment. J. Riishede and E. S. Staffeldt. *(pp. 70-72)*

● Cerebrovascular disease is of growing concern to the general practitioner as well as to the staff members of the hospitals. Apoplexy is the third most frequent cause of death in the USA as in Denmark, outranked only by heart disease and cancer. Medical statistics show that in Denmark, a steep increase in deaths from cerebrovascular accidents has occurred since 1943, and that the increase affects all age groups over 45 years. Cerebrovascular accident is a neurological syndrome, not a disease per se, and the underlying causes can not be ascertained adequately by usual clinical methods. Since 1951 carotid angiography has been introduced into the routine examinations of more than 200 patients with acute cerebrovascular accidents admitted to the Department of Neurosurgery, University Hospital in Aarhus, Denmark. Details of technic and complications encountered will be described. Neurosurgical procedures (evacuation of intracerebral hematomas) are briefly mentioned. Treatment prescribed and administered by the Department of Neurosurgery is outlined.

Requests for reprints and/or information should be directed to: E. Schack Staffeldt, M.D., Barthsgade 7, Aarhus, Denmark, Europe.

A Study of the Effectiveness of a Nylon Nonrubberized Elastic Stocking. E. C. Klein and L. J. Bronstein. *(pp. 73-78; 2 tables)*

● A large number of patients requiring elastic support for the lower extremities will not wear such support unless it is esthetically suitable and reasonably economical. A group of patients in this study found the stock to fulfill these requirements. The nylon elastics provided support in conditions of moderate abnormal venous states of the lower extremities causing edema; relieved symptoms associated with varicose veins, the postphlebitic phenomenon, chronic venous insufficiency, and in the absence of demonstrable pathology gave symptomatic relief to patients with "tired feet."

Requests for reprints and/or information should be directed to: Eugene C. Klein, M.D., 1089 Madison Ave., New York 28, N. Y.

MARCH

Registry Examination Data Feed-Back in Physical Therapy Education. C. d'A. Gerken. *(pp. 91-98; 2 tables and 1 chart)*

● Subject matter and total Registry examination scores of physical therapists recently graduated from 35 approved schools were compared, school by school. Data indicate graduates from each school have relative strengths and weaknesses; that graduates of no school are below the mean of the total group in all areas; that considerable variability exists among the scores earned by the 1,204 graduates in the subject matter fields; and that relative rankings of schools, determined by the scores achieved by their graduates, show consistency over time. It is suggested that results of the investigation provide unique types of data which may be used to evaluate some outcomes of physical therapy education in the United States.

Requests for reprints and/or information should be directed to: American Registry of Physical Therapists, 30 N. Michigan Ave., Chicago 2, Ill.

Electromyographic Composition of Poliomyelitis-Injured Muscle. E. F. Adams and G. C. Knowlton. *(pp. 99-104; 2 tables)*

● This paper reports the results of an electromyographic survey of 120 poliomyelitis injured muscles. The subject muscles were evenly distributed through the Lovett grades from zero to G or better. The incidence of fibrillation, voluntary polyphasic units, normal contour motor units and silence has been tabulated on the basis of a sixty point examination of each muscle. The incidence pattern of these electromyographic features in relation to muscle grade is described and the significance of these findings to diagnosis, prognosis and treatment is discussed.

Requests for reprints and/or information should be directed to: Ernest F. Adams, M.D., 619 N. Glen Oak Ave., Peoria, Ill.

Use of Hydrocollator Packs in the Treatment of Neck and Shoulder Pains. Y. M. Cordray and E. M. Krusen, Jr. *(pp. 105-108; 3 figures and 1 table)*

● This report is based on a study of more than 100 patients with symptoms of pain in the neck and shoulder and headache, classified as "cervical syndrome." The purpose of this study was to evaluate the use of Hydrocollator packs as opposed to short wave diathermy for therapeutic results. All patients selected were treated by the Hydrocollator pack as the only form of heat. This was usually followed by deep sedative massage and an active neck exercise program. There were several patients in this group who were treated with Hydrocollator packs because short wave diathermy was contraindicated. Patients were divided according to sex and classified on the basis of etiology. Results of treatment were determined for each group. The results obtained by the use of the Hydrocollator in relieving symptoms compared favorably with those previously obtained for a similar group of patients treated by short wave diathermy.

Requests for reprints and/or information should be directed to: Edward M. Krusen, Jr., M.D., Baylor University Hospital, 3500 Gaston Ave., Dallas 10, Texas.

Status of the Prevocational Unit. E. B. Nadler and M. Peszczynski. *(pp. 109-112)*

● Review of the literature on the prevocational unit reveals considerable debate regarding its functions and the personnel qualified to administer it. Amid the confusion, however, proponents of the various points of view agree that it consists mainly of actual work tasks selected from jobs which the disabled patient conceivably might enter. These tasks are usually, but not always, administered to the patient by occupational therapists. In its actual operation, the prevocational

unit has had two major functions — therapy, to improve work tolerance and readiness, and evaluation, to assess work skills, attitudes and performance. We suggest that much of the current debate in the literature would be resolved if the prevocational unit, in its therapeutic and evaluative aspects, were subjected to systematic, controlled study. Current research in psychological, vocational, and dexterity testing holds promise of isolating most of the factors which presently operate in prevocational performance. As evaluation, the prevocational unit would no longer be required. From the therapeutic viewpoint, prevocational prescriptions could be written that would proceed from tested therapeutic methods. Thus, prevocational therapy would return to its proper place, the occupational therapy center.

Requests for reprints and/or information should be directed to: Eugene B. Nadler, Ph.D., The Highland Shop, Highland View Hospital, Ireland Drive, Cleveland 22, Ohio.

A Vocational Work Adjustment Unit: Eight Months' Experience. E. B. Shires. *(pp. 113-117; 1 figure and 2 tables)*

● The work adjustment program which is operative at the Rehabilitation Institute of Kansas City, Mo., is described. The patients referred to this program are the hard core which the Division of Vocational Rehabilitation and other organizations engaged in the placement or training of disabled individuals have been unable to place by the usual methods. It was found, following an 11-week work adjustment program, that it was possible to place 26.6 per cent of these patients in competitive industry or training. At the present time, all individuals who are included in this percentage are in a firm placement. Although this is a small group of patients and a relatively short followup, it is believed that this study suggests an approach in the vocational rehabilitation of the severely disabled individual.

Requests for reprints and/or information should be directed to: Edward B. Shires, M.D., University of Kansas Medical Center, Kansas City, Kans.

New Apparatus: A Therapeutic Wheelchair for Above-Knee Amputees. S. G. Feuer. *(pp. 118-119; 3 figures)*

● A wheelchair is described which can be adapted in selected cases for prophylactic or therapeutic management of above-knee stumps where the patient remains confined to bed or wheelchair.

Requests for reprints and/or information should be directed to: Samuel G. Feuer, M.D., 132 Lafayette Ave., Brooklyn 38, N. Y.

APRIL

Relief of Arthritic Pain and Rehabilitation of Chronic Arthritic Patient By Extended Sympathetic Denervation. R. Herfort and S. H. Nickerson. *(pp. 133-140)*

● Pain arising in the weight-bearing joints is the major source of disability presented by most patients with chronic arthritis. The difficulty in alleviating joint pain, permanently and consistently, is the principal obstacle to the rehabilitation of these patients. During the past 3½ years, the authors have employed a surgical technic of so-called extended lumbar sympathectomy in a group of some 15 unselected patients with advanced rheumatoid arthritis and osteoarthritis of the hip and/or knee joint. The operative procedure consists of an ipsilateral retroperitoneal lumbar sympathetic denervation encompassing the lumbar sympathetic trunk distal to the crus of the diaphragm, accessory sympathetic ganglia, and decussating fibers in the prevertebral lumbar plexus. The surgery, in this group of middle-aged and elderly patients, has had no morbidity and no mortality. In the immediate postoperative period, these patients exhibited remarkably effective, consistent, and lasting relief of joint pain with concomitant improvement in joint mobility and in general functional capacity. These patients have been followed for periods up to four years postoperatively and, in all instances, the relief of joint pain and improved mobility have persisted. There have been no untoward effects noted in the follow-up period to date. Charcot arthropathy has not occurred nor is it anticipated.

Requests for reprints and/or information should be directed to: Robert Herfort, M.D., 5 Old Mamaroneck Rd., White Plains, N. Y.

Management of the Bladder in Traumatic Paraplegia. P. A. Morales and R. S. Hotchkiss. *(pp. 141-149; 3 figures)*

● One of the consequences of injury to the spinal cord is disturbance of bladder function. The neurogenic bladder in traumatic paraplegia generally expels its contents involuntarily and incompletely. As a result of urinary incontinence, the paralyzed patient becomes uncomfortable, foul-smelling, and socially isolated. Urostasis in the bladder leads to urinary infection, which, if not controlled or eradicated, readily spreads to the upper urinary tract and causes irreparable renal damage. Back pressure from the retained urine may eventually cause dilation of the ureter as well as the pelvis and calyces, and consequently further renal destruction. Stagnation of urine, in combination with other factors related to immobilization, promotes the formation of stones, which not only aggravates infection but also destroys kidney function by obstruction. Thus, the paraplegic individual, although no longer doomed to an early death, faces a long-term prognosis that remains speculative.

Requests for reprints and/or information should be directed to: Pablo A. Morales, M.D., New York University-Bellevue Medical Center, 420 East 34th St., New York 1, N. Y.

A Study of Contractures in Muscular Dystrophy. K. C. Archibald and P. J. Vignos, Jr. *(pp. 150-157; 2 figures and 4 tables)*

● The status of 43 muscular dystrophy patients actively being followed over a three-year period in the Muscular Dystrophy Clinic at University Hospitals of Cleveland has been reviewed. The study reveals certain significant correlations in the functional status and muscle strength with the degree and progression of joint contractures. This study particularly emphasizes the disabling effect of the different types of contractures, particularly in the lower extremities and compares the results of a well-outlined conscientiously applied stretching program with the natural progression of joint contractures in muscular dystrophy. Environmental factors are directly related to the success of a home exercise program. Success in application of lower extremity bracing for advanced dystrophy is dependent on correct timing and shows an important correlation with the extent of contractures. Iliotibial band contracture appears to play an important role in joint contractures and deformity in muscular dystrophy, although little attention has been focused on its role in this disease. The occasional judicious use of surgery in the control of joint contracture and iliotibial band tightness offers promise of an accessory measure in controlling joint deformities.

Requests for reprints and/or information should be directed to: Paul J. Vignos, Jr., M.D., Western Reserve University, 2220 Cummington Rd., Cleveland 6, Ohio.

Effects of Ultrasound on Growing Bone. J. L. Vaughen and L. F. Bender. *(pp. 158-160; 3 figures)*

● The epiphyseal area of growing bone is currently considered a contraindicated site for ultrasonic therapy. Previous studies show that damage occurs to bone cortex and bone marrow with high intensities of ultrasound. The effect of clinical doses of ultrasound upon the epiphyses of growing rabbits was studied. The left knee area of 20 animals was treated underwater with 1 w/cm² from a 12 cm² sound head for five minutes daily from the age of three months until there was x-ray evidence of epiphyseal closure (6-8 months). The untreated legs served as controls. Comparison of the data showed no significant difference in bone length, microscopic appearance or rate or manner of epiphyseal closure between the treated and control leg.

Requests for reprints and/or information should be directed to: Leonard F. Bender, M.D., Physical Medicine Department, University Medical Center, Ann Arbor, Mich.

Role of the Work Classification Unit of the Los Angeles County Heart Association. S. S. Sobin; W. G. Frasher; C. A. Alexander, and L. Horovitz. *(pp. 161-165)*

● The Los Angeles County Heart Association work classification unit has been in operation for almost four years. In that period it has successfully shown to employers, personal and industrial physicians, and others that many patients with cardiovascular disease are capable of working. Two important conclusions have resulted from this experience. One is that a demonstration of workability is not the same as a demonstration that heart patients can be rehabilitated. Actually, the demonstration of workability becomes the justification for rehabilitation services. The second is that demonstration does not mean simply "showing" that many heart patients can work. It must also mean changing community attitudes and patterns of service. This necessitates such activities as publicity, training, observation, and extension of services. This concept also has implications for the length of time required for a successful demonstration.

Requests for reprints and/or information should be directed to: Mr. Leon Horovitz, c/o Los Angeles County Heart Association, 660 S. Western Ave., Los Angeles 5, Calif.

MAY

An Analysis of the Rehabilitation Needs and Prognoses of 232 Cases of Cerebral Vascular Accident. M. Lowenthal; J. S. Tobis, and I. R. Howard. *(pp. 183-186; 7 tables)*

● Two hundred and thirty-two cases of cerebrovascular accident were admitted during a period of one year to a 1,000 bed municipal hospital. These cases represented four per cent of all medical admissions. They were evaluated and followed by the rehabilitation service. Descriptive material for the group includes analysis of such factors as age, sex, side of hemiplegia, mortality, previous episodes, etc. Physical and laboratory findings such as coma, incontinence, aphasia, blood pressure, muscle tone and cerebrospinal fluid were also recorded. The analysis of rehabilitation prognosis in the patients who survived the incident indicates that the presence of a rehabilitation service in a general hospital may favorably influence functional recovery in the hemiplegic patient.

Requests for reprints and/or information should be directed to: Milton Lowenthal, M.D., 1 East 105th St., New York 29, N. Y.

Temperature Rise of Various Tissues in the Dog on Exposure to Ultrasound at Different Frequencies. J. W. Gersten. *(pp. 187-192; 3 figures)*

● Various areas of the anesthetized dog were sounded at frequencies of 490 kc./sec., 1 mc./sec., and 3 mc./sec., and temperatures were recorded in different tissues. In all situations tested, the effective depth of penetration at 3 mc./sec. was not great, as measured by temperature rise. With relatively superficial bone, the temperature rise at the bone surface was greater than that of overlying muscle when sounding was done at frequencies of 490 kc./sec. and 1 mc./sec. At the two lower frequencies studied, temperature rise within the spinal canal was approximately the same as temperature rise of subcutaneous tissue. "Selective" heating of nerve was especially evident at 490 kc./sec.

Requests for reprints and/or information should be directed to: Jerome W. Gersten, M.D., Department of Physical Medicine and Rehabilitation, University of Colorado Medical Center, 4200 E. Ninth Ave., Denver 20, Colo.

Iontophoresis Studies with a Radioactive Tracer. H. T. Zankel; R. H. Cress, and H. Kamin. *(pp. 193-196; 1 figure and 1 table)*

● This is a report on a program of research to determine the amount of radioactive substance absorbed during iontophoresis. This work deals with ion transfer studies using radioactive iodine, with and without the application of heat and other modalities. Measurements are reported for skin absorption, and skin transmission as evidenced by tracer studies in 24 hour urine samples.

Requests for reprints and/or information should be directed to: Harry T. Zankel, M.D., Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Fulton St. and Erwin Rd., Durham, N. C.

Role of Personality Traits in Rehabilitation Problems. M. D. Zane. *(pp. 197-202; 1 figure)*

● In psychiatry, the development of personality traits as defenses against anxiety is widely accepted. In rehabilitation, personality traits often interfere with motor learning and create serious problems. This paper cites cases to show how personality traits interfere with motor learning; suggests a mechanism to explain the interference, and indicates management of the problem. Concrete methods for increasing the patient's reception of information during the task performance and reducing the interfering sensory-motor effects of the personality traits are discussed. Personality traits become a rehabilitation problem when they produce cortical effects which interfere with the progressive cortical reorganization that characterizes motor learning.

Requests for reprints and/or information should be directed to: Manuel D. Zane, M.D., 15 East 36th St., New York 16, N. Y.

Oral Intermittent Positive Pressure Breathing (OIPPB) in Poliomyelitis. W. D. Loeser and M. F. Kerr. *(pp. 203-209; 2 figures)*

● A new manner of artificial ventilation is described in which filtered air is intermittently pumped to the patient's mouth using a hose and pipestem mouthpiece. This has several advantages over conventional methods of mechanical artificial ventilation for the convalescent poliomyelitis patient e.g., self-regulation of tidal volume, partial self-regulation of rate, improved accessibility for nursing care, freedom from shell and tank encumbrances, less hindrance to standing and walking, and preservation of rib cage mobility through maintenance of normal respiratory excursions. Thus, OIPPB has proved useful for both artificial ventilation and physical therapy. As with other positive pressure methods, OIPPB may affect the peripheral circulation by elevating intrapleural, right atrial and systemic venous pressure. The over-all advantages of OIPPB have been demonstrated in 34 poliomyelitis patients requiring respiratory assistance; two case reports are given.

Requests for reprints and/or information should be directed to: William D. Loeser, M.D., The Youngstown Hospital Association, South Side Unit, Youngstown 1, Ohio.

Recognizing Anxiety in Counseling. T. A. Routh. *(pp. 210-213)*

● Severe emotional deficiencies may overwhelm even the most healthy personality. Some personality structures are totally incapable of handling average stresses, conflicts, tensions and frustrations. Yet, man is quite capable of dealing with considerable stress and anxiety before being emotionally overcome. It is important for a counselor to remember that if he understands the causes for anxiety, it will greatly increase his rapport with those with whom he works. A counselor should also realize however, that the mere discontinuance of a client's behavior or surface symptoms, is not indication of solution to the basic insecurity causing such symptoms.

Requests for reprints and/or information should be directed to: Mr. Thomas A. Routh, Florida Council for the Blind, 923 20th Ave., Tampa 5, Fla.

JUNE

Postoperative Management and Rehabilitation of the Hemipelvectomized Patient. T. F. Childs and M. Holtzman. *(pp. 227-230; 10 figures)*

● Initial and maintained fit of the prosthesis is a most difficult problem for a hemipelvectomized person. However, these individuals can be fitted successfully. Instead of walking stiff-legged as is usual, it is possible to develop good gait patterns flexing the knee of the prosthesis. These patients should be discouraged from becoming too adept in the use of crutches. This will cause a poor gait pattern, keeping the center of gravity over one remaining extremity even after the prosthesis is used.

Requests for reprints and/or information should be directed to: Milton Holtzman, M.D., 450 De Mott Ave., Rockville Centre, N. Y.

Some Considerations of an Optimal Residency Program in Physical Medicine and Rehabilitation. E. W. Johnson; R. E. Worden, and R. D. Burk. *(pp. 231-237; 1 figure)*

● In order that this specialty continue to grow it is imperative that the training programs for physicians specializing in physical medicine and rehabilitation be well organized and standardized, as well as comprehensive, covering training and experience in every aspect of the field. The essentials of this residency program and the advantages and disadvantages of such a program in a university setting are discussed. The present physical medicine and rehabilitation program at Ohio State University Health Center is described.

Requests for reprints and/or information should be directed to: Ernest W. Johnson, M.D., 2470 Cranford Rd., Columbus 21, Ohio.

Vocational Evaluation by Work Sample Technic and Its Dependence upon Medical Contributions. W. C. Gorthy; R. C. Darling; L. T. Pai, and J. O'Brien. *(pp. 238-242; 3 figures)*

● After twenty years' experience, the Institute for the Crippled and Disabled has perfected a method of vocational evaluation which uses the job sample as the primary technic. Called the TOWER System which is the short title for "Testing, Orientation and Work Evaluation in Rehabilitation," it has been published for general use in rehabilitation agencies. Incorporating the TOWER System into a comprehensive rehabilitative process requires the active participation of the medical staff to assess the patient's physical limitations in terms of specific job areas; prescribe treatment leading to improved vocational performance; prescribe the limits of and regulate work tolerance; prescribe adaptive devices that will improve vocational potential, and, review specific vocational recommendations to consider their compatibility with the long-term health needs of the patient. This paper explains the fundamentals of the TOWER System and points up the necessity for active participation by the medical staff in its use. It also cites the results of the past five years with successful cases evaluated by this process and gives case illustrations to demonstrate the manner in which a well-organized system of evaluation can produce better results in terms of more realistic vocational goals.

Requests for reprints and/or information should be directed to: Mr. Willis C. Gorthy, Institute for the Crippled and Disabled, 400 First Ave., New York, N. Y.

Neurotripsy: A Surgical Method for Instigating Reinnervation of Diaphragmatic Paretic Muscle Fibers in Respiratory Embarrassment Following Poliomyelitis. H. E. Billig, Jr. *(pp. 243-246; 8 figures)*

● In poliomyelitis, residual respiratory embarrassment may be the result of loss of a sufficient share of the motor nerve axons of the phrenic nerves reducing the innervated diaphragmatic muscle fibers to below the point of providing sufficient power to aerate the lung properly. The denervated muscle fibers (about 125 per motor nerve axon) do not necessarily degenerate, but atrophy, and are capable of restoration to function if reinnervated by increased arborization of the residual intact motor nerve axons. A means for instigating increased arborization of the remaining intact motor nerve axons is presented, together with two illustrative case histories in which this has successfully been accomplished.

Requests for reprints and/or information should be directed to: Harvey E. Billig, Jr., M.D., The Billig Clinic, 139 S. Alvarado St., Los Angeles, Calif.

Threshold Muscular Fatigue Level and Strength Decrement Recovery of Elbow Flexor Muscles Resulting from Varying Degrees of Muscular Work. P. J. Pastor. *(pp. 247-252; 3 figures and 2 tables)*

● The purposes of this study were to determine the threshold muscular fatigue level from elbow flexion ergographic exercise under optimum work output conditions and the rate of strength recovery following various amounts of fatiguing exercise of the elbow flexor muscles. Fourteen situations were studied, ranging from strength testing only through exhaustive ergographic exercise. The strength decrements 30 seconds after exercise were not statistically significant until the ergographic situation of nine repetitions was reached, so this amount of exercise was considered the threshold level. Greater consistency in recovery curves resulted as the number of repetitions increased. The number of contractions by the subjects in exhaustion testing was appreciably less than for those who were assigned 35 and 40 repetitions. One explanation could be the difference in motivation between an assigned number of repetitions to complete and a voluntary exhaustive exercise situation.

Requests for reprints and/or information should be directed to: Paul J. Pastor, Ed.D., Fresno Junior College, Fresno, Calif.

JULY

The International Federation of Physical Medicine. F. H. Krusen. *(pp. 275-284; 4 figures)*

● The details of the first and second international congresses of physical medicine are recalled with an outline of the plans for the third congress under the auspices of the American Congress and American Academy of Physical Medicine and Rehabilitation. Since international accord and mutual understanding have characterized the previous congresses of the Federation, it is hoped that new heights of international felicity shall be achieved through continuing efforts to promote the health of all mankind by providing physical treatment and rehabilitation of handicapped persons throughout the world.

Requests for reprints and/or information should be directed to: Section of Publications, Mayo Clinic, 201 First St., S.W., Rochester, Minn.

Athetosis: Neuromuscular Dsyfunction and Treatment. H. Kabat and M. McLeod. *(pp. 285-292)*

● Paresis of voluntary movement is a constant finding in athetosis. Isotonic contraction is weaker than isometric contraction, and muscle power is less in the lengthened position. Imbalance of antagonistic muscles is also present. The goal of treatment is correction of paresis with improvement in voluntary motion and performance, which is accompanied by decrease in athetoid irradiation. Modified technics of proprioceptive facilitation are applied for this purpose, with emphasis on isotonic function and imbalance of antagonists. The athetoid irradiation resulting from the resistive exercise can safely be ignored. Training in normal patterns of movement is included in the facilitation program. Habit training in posture, gait, and essential skills is also carried out.

Requests for reprints and/or information should be directed to: Herman Kabat, M.D., Miriam Hospital, 164 Summit Ave., Providence, R. I.

Conference of Rehabilitation Centers: A Report. N. K. Covalt. *(pp. 293-299)*

● The growth of interest in rehabilitation has been remarkable. It is not surprising that the increase in centers has outstripped the supply of interested physicians and even the interest on the part of the medical profession. The latter, by training and practice, has not as yet had the vision of the teamwork needed in rehabilitation of the chronically ill or disabled patient.

Requests for reprints and/or information should be directed to: Nila Kirkpatrick Covalt, M.D., 280 Edinburg Dr., Box 1494, Winter Park, Fla.

AUGUST

A Radiographic Method of Evaluating Hip Flexion Contractures. L. M. Rothman;

O. Deutschberger; M. Lowenthal, and J. M. Breuer. *(pp. 325-329; 4 figures and 1 table)*

● Flexion contracture at the hip joint is found as a complication in a wide variety of physical conditions encountered on a rehabilitation service. This complication is not an infrequent factor limiting the ambulation goals of the rehabilitation patient. The usual methods of estimating the presence and degree of hip flexion contracture by the eye alone or even with a goniometer are subject to considerable error. A technic of mensuration utilizing a lateral x-ray projection has yielded reproducible measurements with a high degree of accuracy. Fixed bony landmarks give origin to lines which when extended form an angle. The measurement of this angle gives an absolute figure which represents the relationship between the bony pelvis and the femur, and permits objective evaluation of the therapeutic effectiveness in dealing with limitation of hip extension.

Requests for reprints and/or information should be directed to: Leon Rothman, M.D., 2453 Ocean Ave., Brooklyn 29, N. Y.

Further Studies of Brief Isometric Exercises. W. T. Liberson and M. M. Asa. *(pp. 330-336; 5 figures and 2 tables)*

● Effectiveness of daily brief (6 second) isometric exercises as compared with the DeLorme exercises was investigated in 26 normal individuals (hypothenar eminence was exercised). It was found that these exercises produce increase in strength and endurance more rapidly than the DeLorme type of exercise. Additional increase in strength and particularly endurance was found, however, when 6 second brief isometric exercises were repeated several times a day. No contralateral effects are observed. The results were confirmed by a direct recording of the muscle contractions produced by electrical stimuli prior to and after training. Repeated brief isometric exercises were applied to patients with lower motor neuron lesions with satisfactory results. The significance of these findings is discussed.

Requests for reprints and/or information should be directed to: W. T. Liberson, M.D., Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Hines, Ill.

Sequence of Action of the Diaphragm and Intercostal Muscles During Respiration. II: Expiration. A. J. Murphy; G. H. Koepke; E. M. Smith, and D. G. Dickinson. *(pp. 337-342; 1 figure and 4 tables)*

● The pattern of activity of the diaphragm and intercostal muscles during passive and forced expiration of measured volumes of air was studied by means of the multiple-channel electromyograph using the needle electrode technic. The point of onset or cessation of the muscle action potentials was determined with reference to the onset of expiratory air flow. When a forced expiration is initiated from a deep inspiration, intercostal activity occurs consistently and is recruited sequentially from the eleventh intercostal upward, while activity in the diaphragm stops at the onset of expiration. However, the smaller the volume of air in the lungs at the beginning for a forced expiration the more likely that the intercostals will become active simultaneously with the onset of the expiration. During passive expiration, intercostal and diaphragmatic inspiratory activity tapers off into expiration, suggesting a braking action by these muscles to oppose the elastic forces of the lung.

Requests for reprints and/or information should be directed to: Alma J. Murphy Ph.D., Department of Physical Medicine and Rehabilitation, University Hospital, 1313 E. Ann St., Ann Arbor, Mich.

A Reaction of Degeneration Scanner. A. J. Heather and M. A. Apostolico, Jr. *(pp. 343-346; 5 figures)*

● A simplified, portable, compact reaction of degeneration scanner is described, and the electrical characteristics of the instrument discussed in detail. This apparatus provides a quick bedside method for the detection of peripheral nerve lesions. The development of the scanner points up the advantages of cooperation between electronics engineers and physicians working together to design as well as test new and improved equipment.

Requests for reprints and/or information should be directed to: Arthur J. Heather, M.D., Medical Director, Eugene Dupont Hospital and Rehabilitation Center, 3506 Kennett Pike, Wilmington 6, Del.

SEPTEMBER

Radiologic Aspects of Moderately Severe Cervical Spine Trauma — *Panel Discussion on Head, Neck and Arm Symptoms Subsequent to Neck Injuries.* **M. S. Abel.** *(pp. 371-378; 6 figures)*

● The small elements of the cervical vertebrae are easily and frequently fractured by whiplash and other traumata. The symptomatology is quite variable both immediately after the injury and some years later. Painstaking x-ray examination of the cervical spine, including additional specialized views, frequently demonstrate these lesions not usually seen on routine views. Lateral mass lesions have characteristic deformities, which may serve as foci of hypertrophic change involving the apophyseal joints and joints of Luschka.

Requests for reprints and/or information should be directed to: Martin S. Abel, M.D., 655 Sutter St., San Francisco 2, Calif.

Range of Mobility of the Cervical Spine — *Panel Discussion on Head, Neck and Arm Symptoms Subsequent to Neck Injuries.* **F. J. Kottke and M. O. Mundale.** *(pp. 379-382; 2 figures and 2 tables)*

● Evaluation of motion in the neck is difficult because of the short broad vertebrae buried beneath soft tissue which is thick in relation to the lengths of the moving segments. Such evaluation is further complicated because the relatively spherical head does not provide good reference points of evaluation of motion. Because of greater mobility at the upper and lower ends of the neck than in the midcervical region, unit concept of cervical motion is made even more inaccurate. Motion between adjacent vertebrae should and must be studied by x-ray. Cinefluorography promises considerable assistance in evaluation of relative positions and motions of adjacent vertebrae. Considering current technics and understanding of kinesiology of cervical motion, single figures of ranges of motion in the three primary perpendicular planes as indices of joint motion should no longer be accepted. Studies should attempt to indicate the specific joints involved when there is limitation of motion.

Requests for reprints and/or information should be directed to: Frederic J. Kottke, M.D., Department of Physical Medicine and Rehabilitation, University of Minnesota Medical Center, Minneapolis, Minn.

The Structural Injuries — *Panel Discussion on Head, Neck and Arm Symptoms Subsequent to Neck Injuries.* **R. Jackson.** *(pp. 383-386)*

● It is often difficult to determine the extent of the injury to the cervical spine and it is just as difficult to estimate the amount of residual disability. One can, however, prognosticate with certainty that there will be some permanent disability due to the inevitable degenerative changes which will occur to decrease the functional efficiency of the cervical spine. The functional demands made upon each injured cervical spine are of importance in the determination of the amount of permanent disability. In the ensuing years we will be able to follow more patients who have had neck injuries thereby enabling us to determine better the inevitable changes which occur. Clinical examinations and radiographic studies over a period of 10 to 20 years are necessary.

Requests for reprints and/or information should be directed to: Ruth Jackson, M.D., The Jackson Clinic, 3629 Fairmount, Dallas, Texas.

Head, Neck and Arm Symptoms Subsequent to Neck Injuries: Physical Therapeutic Considerations — *Panel Discussion*

on Head, Neck and Arm Symptoms Subsequent to Neck Injuries. **D. Rubin.** *(pp. 387-389; 3 figures)*

● The combinations of an intensive physical therapeutic program, medication, reassurance, and early return to activity has resulted in a gratifying and rapid relief of head, neck, and arm symptoms subsequent to "whiplash" neck injuries. The regimen which has been outlined emphasizes the importance of physical and mental mobilization rather than the too-frequently employed physical and mental immobilization symbolized by the cervical collar and hospitalization.

Requests for reprints and/or information should be directed to: David Rubin, M.D., University of Southern California Medical School, 6360 Wilshire Blvd., Los Angeles 48, Calif.

Study of Normal Range of Motion in the Neck Utilizing a Bubble Goniometer C. A. Buck; F. B. Dameron; M. J. Dow, and H. V. Skowlund. *(pp. 390-392; 2 tables)*

● There is definitely a clinical need for a standard of normal range of motion in the neck. Much more work must be done to establish such a standard for even a small age group, such as used in this study. To make such a normal range useful clinically, an accurate and reliable, yet relatively simple means of measurement is needed. The methods herein described may fill this need and should be further tested to determine their usefulness.

Requests for reprints and/or information should be directed to: Helen V. Skowlund, Department of Physical Medicine and Rehabilitation, University of Minnesota Medical Center, 860 Mayo Bldg., Minneapolis, Minn.

Special Orthopedic Diagnostic and Therapeutic Considerations — *Panel Discussion on Head, Neck and Arm Symptoms Subsequent to Neck Injuries.* **H. E. Billig, Jr.** *(pp. 393-395; 2 figures)*

● By means of a gliding motion on the facet joints, the neck can tilt forward, backward, sideward as well as rotate. The range of motion is limited by joint ligaments surrounding the entire circumference of the facet joints. If the head and neck is forced in any direction past the normal range of allowable motion, then destructive compression damage occurs to the structures of the neck on the side of the direction of the motion and distention damage occurs on the opposite side. Any facet joint dislocations or subluxations must be reduced and the facet joint ligaments allowed to heal. The neck must be gradually mobilized by routine repeated traction so as to free the nerves and blood vessels from the constricting fibrous irritation. Autonomic blocking agents such as chlorpromazine, hexamethonium, and probanthine serve useful purpose in the early stages of repair.

Requests for reprints and/or information should be directed to: Harvey E. Billig, Jr., M.D., The Billig Clinic, 139 S. Alvarado St., Los Angeles 57, Calif.

OCTOBER

Measurement of Energy Expenditure During Ambulation, with Special Reference to Evaluation of Assistive Devices. G. Bard and H. J. Ralston. *(pp. 415-420; 4 figures and 1 table)*

● A method is described for presenting the results of energy measurements in the ambulation of both normal and disabled subjects. It is shown that the energy curves calculated as calories per meter walked per kilogram of body weight are a most instructive form for presentation of energy data, and may be used for comparing one subject with another, or for comparing the performances of the same subject using a variety of types of assistive devices. Illustrative examples drawn from normal subjects, above-knee amputees, and hemiplegics are provided and discussed.

Requests for reprints and/or information should be directed to: Gregory Bard, M.D., Department of Physical Medicine and Rehabilitation, University of California Medical Center, San Francisco 22, Calif.

A Method for the Functional Evaluation of Disability. J. Sokolow; J. E. Silson; E. J. Taylor; E. T. Anderson, and H. A. Rusk. *(pp. 421-428; 2 tables)*

● The need for an objective method of evaluating disability has become more pressing with the advance of rehabilitation and the passage of legislation of the "disability freeze" type. With systems now in use, it is conceivable that a person might be considered disabled in one state and yet be rehabilitated and selectively placed in a job in another state. This project was undertaken to develop a uniform system of classifying the physical, emotional, social, and vocational capacities of disabled individuals functionally. A tentative classification system has thus been devised embracing the physical, social, emotional, and vocational spheres, and which permits broad application but also detailed expansion where desirable. Data from the forms are punched on I.B.M. cards. These forms have been pilot tested on 100 patients in various stages of rehabilitation at several institutions to determine inadequacies and necessary revisions.

Requests for reprints and/or information should be directed to: Jack Sokolow, M.D., 63-61 99th St., Forest Hills, N. Y.

Use of Lightweight Synthetic Materials to Fabricate Corrective Shoes. H. M. Yanof. *(p. 428)*

● A new concept in the design of orthopedic appliances is discussed. New plastics and other light materials should be substituted for the heavy ones now used in the manufacture of these appliances.

Requests for reprints and/or information should be directed to: Howard M. Yanof, Donner Laboratory, University of California, Berkeley 4, Calif.

Role of Intensive Physical and Occupational Therapy in the Treatment of Cerebral Palsy: Testing and Results. A. J. Ingram; E. Withers, and E. Speltz. *(pp. 429-438; 8 figures and 1 table)*

● Sixty cerebral-palsied children have been subjected to an intensive program of physical and occupational therapy. Progress made by these children has been studied by testing based on a developmental scale of motor and social performance. This developmental scale has been in use for seven years. This test may be improved but appears to be useful in measuring progress objectively, and informative in helping to solve the problem of which patients can be selected most profitably for admission to cerebral palsy installation.

Requests for reprints and/or information should be directed to: Alvin J. Ingram, M.D., Campbell Clinic, 869 Madison Ave., Memphis 5, Tenn.

NOVEMBER

Social Engineering for Rehabilitation. O. L. Freeman. *(pp. 461-466)*

● In this age of plenty, we can afford to apply the best we know — to rehabilitate lives; to educate our children to their fullest potential; to provide adequate housing, law and order, justice, and a healthy environment for the millions crowding into our cities and suburbs; to provide constructive jobs and full production; to provide for the common defense; and to provide economic assistance to peoples in foreign lands to bring them hope for higher standards under democracy and freedom. Our society can provide all these services if we but have the ability, the vision, and the courage to accept the challenge. The courage for the challenge will give rise to a new era in which men will conquer on the frontiers of human relations as they have overcome the physical hazards that beset the frontiers of human progress in ages past.

Rehabilitation of the Bladder in Injuries of the Spinal Cord. W. C. Stolov. *(pp. 467-474; 1 figure and 2 tables)*

● Results on 59 patients with spinal cord injuries treated in the University of Minnesota Rehabilitation Service in the last four years are reviewed. Sixty-four per cent of these are catheter-free. Of those admitted with catheters, 58 per cent were converted to a catheter-free status. Patients with autonomous bladders had a greater conversion rate than did those with reflex bladders. Seventy-four per cent of those with incom-

plete lesions converted compared to 59 per cent of those with complete lesions. The average length of time after injury for the patients to become catheter-free was seven and one-half months. Patients with upper motor neuron lesions converted in six months and those with incomplete lesions made the transition in three months. Ischemic ulcer was the major cause of failure to attain catheter-free status and vesical lithiasis was the most frequent urinary tract complication. The physiology of micturition with respect to the sacral spinal reflex center is reviewed, and technics of treatment are discussed. The treatment program that has evolved in the care of the cord bladder is presented.

Requests for reprints and/or information should be directed to: Walter C. Stolov, M.D., University of Minnesota Hospital, Minneapolis 14, Minn.

Use of Anticoagulants in Cerebral Thrombosis. P. A. Huene. *(pp. 475-479)*

● The clinician is advised to use these drugs cautiously — only in certain types of cerebral vascular accidents, only if certain precautions are taken and a most rigid control maintained. Some believe that anticoagulants are of no benefit whatsoever, as described in this study; others, while recognizing the possible benefit, do not believe that the potential gain in anticoagulant therapy is worth the risk of its inherent danger. Hemorrhage is the primary danger, not only in the brain but in all parts of the body. Infarcts due to emboli are usually hemorrhagic, and anticoagulants given at such times will aggravate the hemorrhagic condition.

Requests for reprints and/or information should be directed to: Phyllis A. Huene, M.D., Community Hospital, Glen Cove, N. Y.

Crutches for a Patient with Severe Upper Extremity Impairment. P. Harbine; N. Staael, and J. A. Evert. *(pp. 480-482; 2 figures)*

● Use of the crutches described in this study may enable an individual to start gait training at an early phase of rehabilitation. The crutches were designed for a four-point gait but have proved substantial enough for a swing-through gait. It is thought that this type of crutch may readily be adapted to other patients with severe disability of one or both upper extremities.

Requests for reprints and/or information should be directed to: Patrick Harbine, Northern Pacific Beneficial Association Hospital, Missoula, Mont.

Ultrasonic Effects as Demonstrated in Live Pigs with Surgical Metallic Implants. J. F. Lehmann; G. D. Brunner; A. J. Martinis, and J. A. McMillan. *(pp. 483-488; 6 figures and 1 table)*

● Maximal therapeutic dose of ultrasonic energy was applied over the areas of surgical metallic implants in live pigs comparable in weight to human beings. Temperature levels measured in the focal area of ultrasonic intensity resulting from reflection at the metal implant surface were within the range generally considered to be therapeutic. Histologic studies demonstrated that ultrasound applied in the presence of a surgical metallic implant did not produce any untoward effects; specifically, there was no evidence of burns, delayed bone and soft tissue healing, or nonthermal reactions, such as cavitation. These results, obtained in live animals with the blood flow intact, demonstrate that it is possible to apply ultrasonic energy safely in the presence of surgical metallic implants. The therapeutic efficacy of ultrasonic energy in the treatment of joint contractures associated with conditions frequently managed with the insertion of metallic implants remains to be evaluated.

Requests for reprints and/or information should be directed to: Justus F. Lehmann, M.D., University of Washington, Department of Physical Medicine and Rehabilitation, Seattle 5, Wash.

Electrocardiographic Changes in Poliomyelitis Patients. R. T. McReynolds and O. L. Huddleston. *(pp. 489-491; 1 figure and 1 table)*

● Electrocardiographic examinations were made on a series of 70 severely involved anterior poliomyelitis patients. All except four of the patients were adults and the examinations were made four to twelve months after the onset of poliomyelitis. None of the patients had a previous history of rheumatic fever or other cardiac disease prior to poliomyelitis. Six or seven per cent of the severely involved poliomyelitis patients showed persistent abnormalities of the electrocardiogram, which were regarded as permanent changes. The alterations of the electrocardiogram occurred in the S T segment and T wave abnormalities.

Requests for reprints and/or information should be directed to: Roy T. McReynolds, M.D., 710 Wilshire Blvd., Santa Monica, Calif.

DECEMBER

Physical Medicine and Rehabilitation — A Phase of Human Ecology. A. C. Jones. *(pp. 505-509)*

● The thought that physical medicine is ancillary, adjunctive or dispensable must be replaced by the conviction that physical procedures are essential elements in any plan for treatment of a patient, omission of which may amount to neglect. Physical medicine and rehabilitation should be a constant consideration of every general practitioner and specialist. This will result in better care for patients everywhere. Everyone who is identified with the specialty bears a great responsibility.

Requests for reprints and/or information should be directed to: Arthur C. Jones, M.D., 712 S.W. 12th Ave., Portland, Ore.

Comparative Study of the Efficiency of Short-Wave, Microwave and Ultrasonic Diathermy in Heating the Hip Joint. J. F. Lehmann; J. A. McMillan; G. D. Brunner, and J. B. Blumberg. *(pp. 510-512; 2 figures and 1 table)*

● It is demonstrated in this study that the temperature of the hip joint could be raised to any desired level by application of ultrasound. Since the rise of temperature measured in that part of the joint directly exposed to ultrasound was much greater than that recorded where the ultrasonic beam had first traversed the bone, it seems advisable to treat the joint from all aspects. Readily accessible for treatment in the human are the anterior, superior, and posterior aspects of the hip. Microwave and short-wave diathermy did not produce a temperature within the therapeutic range in the hip joint. It is assumed that the experimental findings obtained with these forms of energy can be explained by the differences in the depth of penetration, the most important determinant being the thickness of the subcutaneous fat and musculature covering the area being treated.

Requests for reprints and/or information should be directed to: Justus F. Lehmann, M.D., University of Washington, Department of Physical Medicine and Rehabilitation, Seattle 5, Wash.

Report of the Development of the R.I.C. Plastic Tenodysis Splint. C. Sabine; F. Sammons, and B. J. Michela. *(pp. 513-515; 3 figures and 1 table)*

● In attempts to meet the three basic criteria for an ideal tenodysis splint, use of polyester resin has been explored. It is felt the RIC splint meets the basic criteria more than does a metal splint. While clinical application to date has been limited, results have been sufficiently gratifying to merit more widespread consideration in hand disability problems.

Requests for reprints and/or information should be directed to: Bernard J. Michela, M.D., Director, Rehabilitation Institute of Chicago, 401 E. Ohio St., Chicago 11, Ill.

Age- and Sex-Related Muscle Weakness. T. S. Danowski and M. J. Wratney. *(pp. 516-520; 6 figures)*

● Measurements of the performance of muscles against resistance and gravity in healthy children have revealed a relative weakness in the extrapelvic and pelvic groups in boys and girls 7 to 15 years of age. Thereafter, males attain maximal muscle strength in all groups, whereas a significant proportion of females aged 15 to 30 years manifest a weakness of the hip flexors, hip rotators, hip extensors, and the gluteus medius. It is suggested but not established that these age and sex variations in muscle strength are related to androgen-estrogen secretion. The presence of such weaknesses in a normal or average population must be taken into account in tests of muscle performance.

Requests for reprints and/or information should be directed to: T. S. Danowski, M.D., Professor of Research Medicine, 930-936 Health Professions Bldg., University of Pittsburgh School of Medicine, Pittsburgh 13, Pa.

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Announcing . . .

The Seventh Essay Award

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To stimulate interest in the field of physical medicine and rehabilitation, the American Congress of Physical Medicine and Rehabilitation will award annually, a prize for an essay on any subject relating to physical medicine and rehabilitation. The contest, while open to anyone, is primarily directed to interns, residents, graduate students in the pre-clinical sciences and graduate students in physical medicine and rehabilitation. The Essay Award Committee suggests that members of the American Congress and American Academy of Physical Medicine and Rehabilitation bring this announcement to the attention of interested persons. The following rules and regulations apply to the contest:

1. Any subject of interest or pertaining to the field of physical medicine and rehabilitation may be submitted.

2. Manuscripts must be in the office of the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, not later than March 1, 1960.

3. Contributions will be accepted from interns, residents, graduate students in the pre-clinical sciences, and graduate students in physical medicine and rehabilitation.

4. The essay must not have been published previously.

5. The American Congress of Physical Medicine and Rehabilitation shall have the exclusive right to publish the winning essay in its official journal, the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION.

6. Manuscripts must not exceed 3000 words (exclusive of headings, references, legends for cuts, tables, etc.), and the number of words should be stated on the title page. An original and one carbon copy of the manuscript must be submitted.

7. The winner shall receive a cash award of $200.

8. The winner shall be determined by the Essay Award Committee composed of four members of the American Congress of Physical Medicine and Rehabilitation.

9. All manuscripts will be returned as soon as possible after the name of the winner is announced.

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